

# ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 2017

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## HEARINGS BEFORE A SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS HOUSE OF REPRESENTATIVES ONE HUNDRED FOURTEENTH CONGRESS SECOND SESSION

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### **PART 8** **NATIONAL NUCLEAR SECURITY ADMINISTRATION** **Energy Weapons Activities and Nuclear Nonproliferation** **and Naval Reactors**



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## **ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 2017**

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TUESDAY, MARCH 1, 2016.

### **DEPARTMENT OF ENERGY—NATIONAL NUCLEAR SECURITY ADMINISTRATION, WEAPONS AND ACTIVITIES AND NUCLEAR NONPROLIFERATION AND NAVAL REACTORS**

#### **WITNESSES**

**FRANK KLOTZ, ADMINISTRATOR FOR NUCLEAR SECURITY, DEPARTMENT OF ENERGY**

**ANNE HARRINGTON, DEPUTY ADMINISTRATOR FOR DEFENSE NUCLEAR NONPROLIFERATION, DEPARTMENT OF ENERGY**

**BRIGADIER GENERAL S.L. DAVIS, ACTING DEPUTY ADMINISTRATOR FOR DEFENSE PROGRAMS, DEPARTMENT OF ENERGY**

**ADMIRAL JAMES FRANK CALDWELL, JR., DEPUTY ADMINISTRATOR FOR OFFICE OF NAVAL REACTORS, DEPARTMENT OF ENERGY**

Mr. SIMPSON. I would like to call this hearing to order and good afternoon, everyone. Administrator Klotz, I would like to welcome you to your second appearance before the Subcommittee to testify on the budget request for the National Nuclear Security Administration, which includes programs that sustain our nation's nuclear weapons stockpile, advance U.S. nuclear nonproliferation goals, and support the nuclear Navy.

Admiral Caldwell, I would like to thank you for your service to this country and welcome you to your first appearance before this Subcommittee. Since the Director of Naval Reactors serves an 8-year term, we look forward to having you this year and many years to come. You are probably going to outlast me. I am at that stage of life where 8 years is like have we got our plots ready?

General Davis, I would like also welcome you and thank you for your service to the country. This is the second time you have testified before the Subcommittee, but the first in your new capacity as the Acting Director of Defense Programs.

Ms. Harrington, I welcome you back. I believe we may have actually lost count of the number of times you testified before this Subcommittee. The expertise you bring to the table is incredibly valuable and we thank you for your continued dedication to the nonproliferation programs.

The President's Budget Request for the National Nuclear Security Administration is \$12.9 billion, an increase of \$357 million, or 2.9 percent above last year's level. Since the overall budget cap set by the Bipartisan Budget Control Act are flat compared to last year's level, the increases requested for defense activities for NNSA

will need to compete with other important defense programs across the federal government.

Within the NNSA budget request itself, that same competition for resources is evident. The Administration's nuclear modernization plans continue to exert large pressures on available funds. Weapons Activities has increased by \$357 million and Naval Reactors is increased by \$45 million, while Nonproliferation activities are decreased by \$132 million.

We hope to hear more from you today on the prioritization in your budget request and how you intend to accomplish the modernization activities that are need to extend the life of our nuclear deterrent within a constrained budget environment.

Please ensure for the hearing record that responses to the questions for the record and any supporting information requested by the Subcommittee are delivered in final form to us no later than 4 weeks from the time you receive them. I also ask that if Members have additional questions they would like to submit to the Subcommittee for the record that they please do so by close of business on Thursday.

With those opening comments I would like to yield to our Ranking Member, Ms. Kaptur, for any opening comments that she would like to make.

[The information follows:]

OPENING STATEMENT  
The Honorable Mike Simpson  
Chairman, Energy and Water Development Subcommittee  
House Committee on Appropriations

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Budget Hearing the National Nuclear Security Administration  
FY 2017 Budget  
March 1, 2016

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With those opening comments, I would like to yield to our ranking member, Ms. Kaptur, for any opening comments that she would like to make.

Ms. KAPTUR. Thank you very much, Mr. Chairman. Welcome. Certainly General Klotz, Admiral Caldwell, Miss Harrington, and General Davis, we appreciate your appearing before the subcommittee this afternoon. And since this subcommittee last met to review the National Nuclear Security Administration Budget, the world continues to see challenges in disparate areas of our globe. It is through that lens that we must assess our strategic future, including importantly, nuclear security.

The possession of nuclear weapons bring an awesome responsibility, and no one knows that more than you do. Still nuclear weapons serve as only one component of our national nuclear strategy. The NNSA nonproliferation program also plays an essential role in securing nuclear material globally and provides a rare, though admittedly recently more limited look into the Russian nuclear program.

Congress, and this subcommittee in particular, must balance the need to maintain our nuclear weapons stockpile with the importance of reducing global vulnerabilities through nonproliferation efforts. And additionally the tremendous amount of money spent on nuclear capabilities compels a sharp attention to ensuring financial responsibility. The NNSA makes up a sizeable portion of this subcommittee's bill with nuclear weapons and Naval Reactors representing 83 percent of NNSA's total budget. Mindful of the many needs of our Nation this subcommittee must ensure precious resources are provided as part of a coherent strategy. Further, the NNSA must demonstrate a continued ability to better manage projects, particularly in the weapons account.

I remain concerned about repeated and astonishing cost increases and schedule delays that plague the NNSA. The nuclear deterrent is too important and resources too precious to waste funds pursuing unnecessary or unrealistic proposals. While NNSA has made progress toward more rigorous project and financial management, much work remains as you well know.

We look forward to our discussion today.

Mr. Chairman, I thank you for yielding the time. And thank you all for being here.

Mr. SIMPSON. And I understand, Administrator, you have the opening statement and you are going to do one.

Mr. KLOTZ. Yes, sir.

Mr. SIMPSON. And the others were submitted for the record, is that correct?

Mr. KLOTZ. Yes, sir.

Mr. SIMPSON. The time is yours.

Mr. KLOTZ. Okay. Thank you, sir. Chairman Simpson, Ranking Member Kaptur, and members of the subcommittee, thank you for the opportunity to present the President's Fiscal Year 2017 Budget Request for the Department of Energy's National Nuclear Security Administration. We have provided you a written statement and respectfully request that it be submitted for the record.

We value this committee's leadership in national security as well as its robust and abiding support for the missions and for the people of the NNSA. Our budget request, which comprises more than 40 percent of DOE's overall budget is \$12.9 billion, an increase of

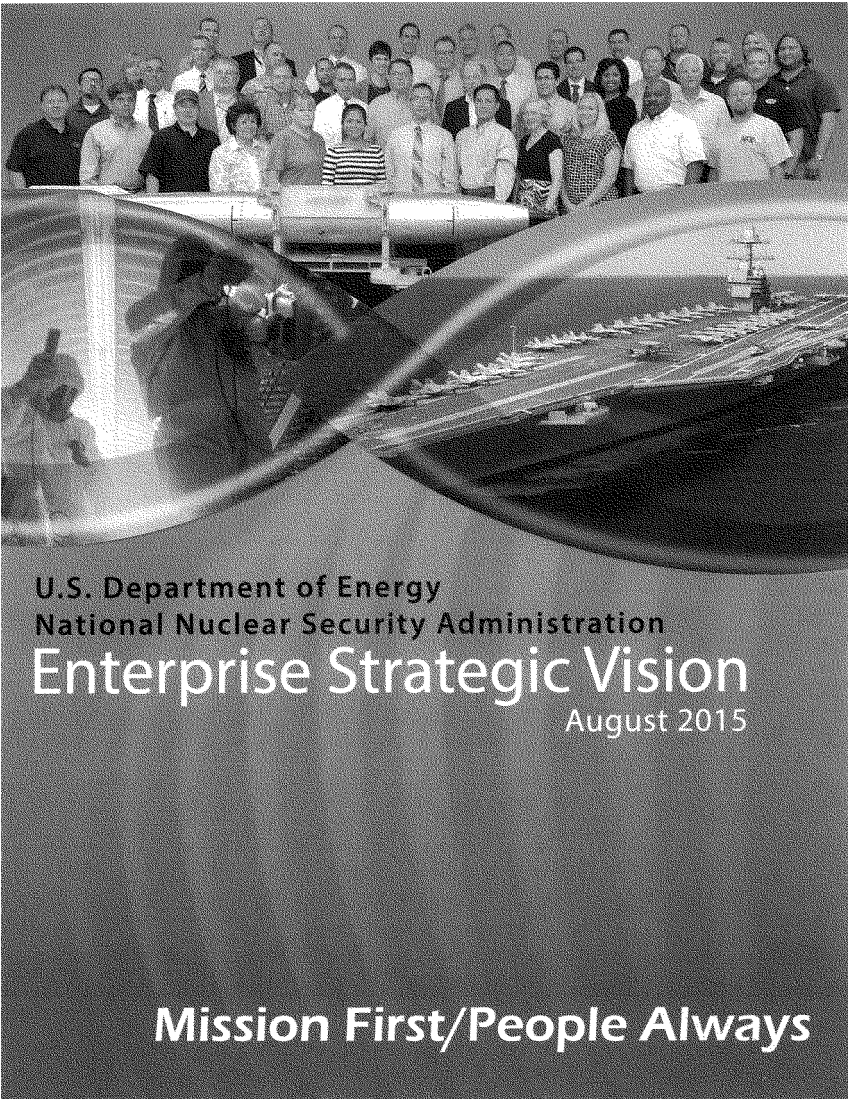


nearly \$357 million or 2.9 percent over the fiscal year 2016 enacted level.

The budget request continues the Administration's unwavering commitment to NNSA's important and enduring missions. These missions are defined in the NNSA Strategic Vision, which we released at the end of last year. They include to maintain a safe, secure, and effective nuclear weapons stockpile; to prevent, counter, and respond to the threat of nuclear proliferation and nuclear terrorism; and, to support the capability of our nuclear powered Navy to project power and to protect American and Allied interests across the globe.

To succeed, NNSA must maintain cross cutting capabilities that enable each core mission, again as defined in our Strategic Vision. These cross cuts focus on advancing science, technology, and engineering, supporting our people, and modernizing our infrastructure, and developing a management culture focused on safety, security, and efficiency, adopting the best practices and use across the government and in the commercial world. If you would like, I would also be pleased to provide a copy of this document to the subcommittee for the record.

[A copy of the NNSA Strategic Vision follows:]





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## Message from the Administrator

"Mission First, People Always" speaks to the enduring and essential nature of the U.S. Department of Energy's National Nuclear Security Administration (DOE/NNSA) mission and to fostering a highly capable workforce committed to national security.

Our core mission pillars are to maintain a safe, secure, and effective nuclear deterrent; to prevent, counter, and respond to the threats of nuclear proliferation and terrorism worldwide; and to provide naval nuclear propulsion. To accomplish this mission, we must maintain crosscutting capabilities that enable each mission pillar, including advancing world-class science, technology, and engineering (ST&E); supporting our people and modernizing our infrastructure; and developing a management culture that operates a safe and secure enterprise in an efficient manner.

Following the *Department of Energy Strategic Plan for 2014–2018*, the *DOE/NNSA Enterprise Strategic Vision* (July 2015) provides a framework for integrating our missions and a future direction in pursuit of DOE's strategic goals. This vision may also serve as a resource to inform external stakeholders of our mission and priorities. It was developed with input from across the Federal and management and operating (M&O) workforces.

The following pages summarize our global strategic environment and how today's challenges and opportunities inform our missions and the broader national security capabilities of the nuclear security enterprise. We describe the core mission pillars and the critical crosscutting capabilities

that enable successful program execution. These are integrated by DOE/NNSA's application of science and technology to address national security challenges.

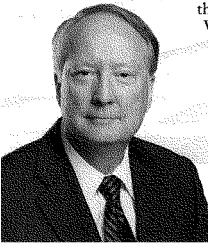
Our mission pillars and crosscuts are realized within the nuclear security enterprise, including the national security laboratories, the production facilities and sites, and the larger DOE laboratory system. Together they provide unique technical solutions to solve the challenges of today and the future. We must continue to provide strong and abiding support for these capabilities and strategically partner with other national security organizations to sustain these national assets into the future.

Beyond this *DOE/NNSA Enterprise Strategic Vision*, in March 2015, DOE/NNSA released further detailed strategy and planning documents: the *FY 2016 Stockpile Stewardship and Management Plan* and the first integrated DOE/NNSA nuclear threat reduction plan entitled, *Prevent, Counter, and Respond: A Strategic Plan to Reduce Global Nuclear Threats (FY 2016–2020)*. These documents, along with additional implementation and governance-related guidance, inform our planning and program activities.

With the release of this strategic vision, we must remain mindful of our obligation to continually improve. The future is challenging and dynamic, but DOE/NNSA is fully committed to ensuring that our mission will be strategically and effectively executed today and into the future.

DOE/NNSA is comprised of talented people who do important work each and every day. We are extraordinarily proud of their service on behalf of our Nation.

Frank G. Klotz  
Under Secretary for Nuclear Security and  
Administrator, NNSA



## Policy Direction



In April 2009, President Obama delivered a speech in Prague, Czech Republic, stating America's commitment to seek the peace and security of a world without nuclear weapons.

"No threat poses as grave a danger to our security and well-being as the potential use of nuclear weapons and materials by irresponsible states or terrorists. We therefore seek the peace and security of a world without nuclear weapons. As long as nuclear weapons exist, the United States must invest the resources necessary to maintain—without testing—a safe, secure, and effective nuclear deterrent that preserves strategic stability. However, reducing the threat requires us to constantly reinforce the basic bargain of the Nuclear Non-Proliferation Treaty, which commits nuclear weapons states to reduce their stockpiles while non-nuclear weapons states remain committed to using nuclear energy only for peaceful purposes."

*National Security Strategy*  
(February 2015)

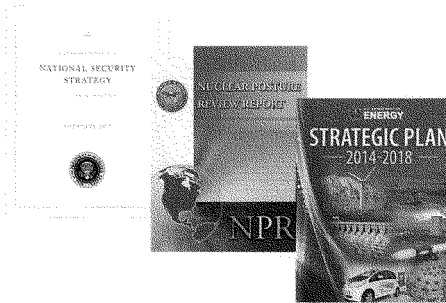
## Policy Direction

DOE/NNSA, whose heritage can be traced back to the Manhattan Project in World War II, is tasked with carrying out DOE's national security responsibilities. DOE/NNSA draws its mission and authorities from the Atomic Energy Act (42 *United States Code* [U.S.C.] § 2011 *et seq.*), and, more specifically, the NNSA Act (50 U.S.C. 2401, *et seq.*). The latter directs DOE/NNSA:

- To enhance United States national security through the military application of nuclear energy.
- To maintain and enhance the safety, reliability, and performance of the United States nuclear weapons stockpile, including the ability to design, produce, and test, in order to meet national security requirements.
- To provide the U.S. Navy with safe, militarily effective nuclear propulsion plants and to ensure the safe and reliable operation of those plants.
- To promote international nuclear safety and nonproliferation.
- To reduce global danger from weapons of mass destruction.
- To support United States leadership in science and technology.

Presidential and DOE strategy documents also provide policy direction for DOE/NNSA's mission. These documents draw from the vision outlined in President Obama's April 2009 speech in Prague, Czech Republic, and reaffirmed in the recently updated *National Security Strategy* (February 2015). This vision recognizes the global threat posed by nuclear proliferation and terrorism and the goal of the United States to "seek the peace and security of a world without nuclear weapons." Equally important, this guidance makes clear that, as long as nuclear weapons exist, they must remain safe, secure, and effective. Therefore, the United States must invest the resources necessary to maintain its deterrent forces, even while pursuing agreements to reduce stockpiles and prevent proliferation.

Further guidance is outlined in the *Nuclear Posture Review Report* (April 2010) and the *Nuclear Weapons Employment Strategy of the United States* (June 2013), ensuring the United States' nuclear posture is aligned to address the rapidly evolving 21st century security environment. Implementing these objectives will reduce the risk of nuclear proliferation and terrorism, maintain strategic stability, strengthen regional deterrence, and assure U.S. allies and partners, while laying the groundwork for reducing stockpiles and living up to U.S. commitments under the Nuclear Non-Proliferation Treaty. A strong nuclear deterrent has a clear link to U.S. nonproliferation goals. North American Treaty Organization and Asian allies must be sufficiently assured by the strength of the U.S. deterrent to forgo any consideration of developing their own capabilities. Additionally, several Presidential Policy Directives, as well as the *National Strategy for Counterterrorism* (June 2011), provide DOE/NNSA with specific policy direction on combating weapons of mass destruction, responding to incidents of nuclear terrorism, and pursuing nuclear weapons safety and security.



In addition, Executive Order 12344 and various statutes require the DOE/NNSA Office of Naval Reactors to be responsible for all aspects of the U.S. Navy's nuclear propulsion program, including research, design, construction, testing, operation, maintenance, and ultimate disposition.

At the international level, President Obama established, and DOE/NNSA supports, the Nuclear Security Summit process, which facilitates direct engagement with other governments and heads of state on urgent matters related to nuclear security. The consensus of participants at the 2010, 2012, and 2014 summits was expressed through summit communiqués, providing a valuable indication of political will and reinforcing international commitments to nuclear security.

In alignment with the above-mentioned statutes and policy directives, the *U.S. Department of Energy Strategic Plan 2014-2018* (April 2014) provides the following strategic objectives for DOE/NNSA:

- Maintain the safety, security, and effectiveness of the Nation's nuclear deterrent without underground nuclear explosive testing;
- Strengthen key ST&E capabilities and modernize the national security infrastructure;
- Reduce global nuclear security threats; and
- Provide safe and effective integrated nuclear propulsion systems for the U.S. Navy.



...the National Nuclear Security Administration's nuclear security enterprise, plays a central role in sustaining a safe, secure, and effective nuclear deterrent and combating proliferation and nuclear terrorism. The science, technology, engineering and manufacturing capabilities resident in the nuclear security enterprise underpin our ability to conduct stockpile stewardship and solve the technical challenges of verifying treaty compliance, combating nuclear terrorism and proliferation, and guarding against the threat posed by nuclear technological surprise. For example, the unique knowledge gained in nuclear weapons design developed to support the U.S. stockpile plays a critical role in the Nation's ability to understand strategic threats worldwide. DOE is responsible for providing the design, development and operational support required to provide militarily effective naval nuclear propulsion plants and ensure their safe, reliable and long-lived operations.<sup>2</sup>

*Department of Energy  
Strategic Plan for 2014-2018*

## Nuclear Security Strategic Environment



"In my almost 50 years in intelligence, I do not recall a period in which we confront a more diverse array of threats, crises, and challenges around the world... This year's threat assessment illustrates how dramatically the world and our threat environment are changing. Threats are growing more interconnected and viral. Events that, at first, seem local and irrelevant can quickly set off transnational disruptions that affect U.S. national interests. It's a world in which our definition of "war" now includes a "soft" version. We can add cyber and financial to the list of weapons being used against us. And, such attacks can be deniable and non-attributable."

James Clapper, Director of National Intelligence, Senate Testimony, March 2013



Distinguishing neutrons and gamma rays is the key to differentiating benign radioactive sources from nuclear substances such as uranium and plutonium.

DOE/NNSA, in coordination with its interagency partners and standing bodies such as the Nuclear Weapons Council, contributes directly to implementing the President's vision through its unique capabilities, expertise, and the resources of the nuclear security enterprise and the broader DOE technical complex. DOE/NNSA's work in support of these objectives is carried out in alignment with the DOE strategic plan's further emphasis on the importance of scientific discoveries and tools; the safe, secure, and efficient operations of the DOE enterprise; workforce recruitment and retention; sustainable infrastructure management; and effective project and contract management.

DOE/NNSA's mission, vision, values, and priorities remain consistent with and flow directly from the entire framework of policy direction, guidance, and international agreements described in this section and align with DOE's responsibility to meet these national strategic objectives.

## Nuclear Security Strategic Environment

The nuclear security strategic environment has changed dramatically over the course of the past two decades and since the end of the Cold War. While the threat of a global nuclear exchange has receded, the global security environment in relation to nuclear weapons and materials is complex. Emerging geostrategic and technological trends signal new challenges. Globalization enables the proliferation of technology that continues to enhance the abilities of both state and non-state actors. Accordingly, countries with geopolitical, military, and economic power or reach are becoming more diverse, thus necessitating greater effort to work with key allies and partners to promote stability and peace.

Given the dynamic nature of the security environment, ensuring a safe, secure, and effective deterrent, as well as capabilities to address global nuclear dangers, is an enduring and evolving mission.

### TRENDS AND CHALLENGES

**Nuclear Weapons and Material Proliferation.** Unresolved regional tensions and imbalances in conventional military forces could tempt states to pursue new nuclear weapons capabilities. Regional tensions may heighten the sensitivity of U.S. allies, making a strong, credible deterrent necessary for their assurance and extended deterrence. Outside the United States, Russia, the United Kingdom, France, and China (the five nuclear weapons states recognized under the Nuclear Non-Proliferation Treaty), several states have demonstrated growing and more-diverse nuclear weapons capabilities and continue to produce fissile material. The potential for regional use of nuclear weapons is one of the gravest risks arising from this trend. Furthermore, the global expansion of civil nuclear power production and the associated spread of civil nuclear materials will challenge national and international capabilities to manage and secure them. The potential for misuse of uranium enrichment and reprocessing capabilities, in particular, threatens U.S. national security, as these technologies are potential acquisition pathways to weapons-usable nuclear materials. In addition, virtually all countries use radiological sources for industrial and medical pursuits, creating the attendant risk of a loss of control over these materials.

## Nuclear Security Strategic Environment

**Non-State Actors and Networks.** The United States and its allies will continue to face the risk of nuclear or radiological attack by a variety of terrorist groups. Acquisition of materials and expertise is a key step toward developing radiological dispersion devices or improvised nuclear devices. To obtain this material, lone-wolf operations, including criminals and homegrown violent extremists, may target nuclear or radiological facilities for theft or diversion. Expanding global trade and the increasing sophistication of illicit trafficking networks may also enhance opportunities for state and non-state actors to acquire nuclear and radiological materials, equipment, and technology. Weak governance, corruption, blurring of borders within regions, the nexus of criminal and terrorist networks, and the use of common network facilitators (e.g., transportation) further complicate the security landscape and pose major challenges for the United States and its allies and partners.

**Advanced Technology Proliferation.** The applications of new technologies, such as additive manufacturing, could potentially revolutionize the means for producing capabilities related to warfare. The diffuse and decentralized nature of science and technology development, coupled with greater information connectivity, will increase the availability of sensitive information and the means to use it. This may create new and worrisome pathways to nuclear weapons and will lower the obstacles to and detectability of covert nuclear weapons development programs. Access to both technology and information could well compromise traditional approaches to nonproliferation, presenting the need to more effectively anticipate technological surprise and rapidly develop new tools and policies to disrupt and respond to the impacts of these emerging technologies.

**Asymmetric Threats.** As technology offers new tools for state and non-state adversaries to pursue asymmetric approaches, some countries will seek new strategies to counter U.S. strengths and advantages by employing anti-access/area-denial, cyber, and space control capabilities. The wider availability and increased capabilities of cyber-attack tools in the hands of malevolent insiders or state and non-state actors may make radiological and nuclear facilities potential targets. In addition, the proliferation of the tactics and techniques associated with constructing improvised explosive devices will present new security challenges. The insider threat, including collusion with outsiders, will remain a major risk with respect to nuclear or radiological material, technology, and expertise.

### INNOVATIVE APPROACHES

Regional and global trends, coupled with continuing fiscal realities, will make it imperative for DOE/NNSA to adapt more quickly and pursue more-innovative approaches and partnerships in response to these challenges. As DOE/NNSA modernizes the nuclear security enterprise and downsizes the Nation's nuclear weapons stockpile, U.S. nuclear weapons will continue to play a role in deterring conflict and assuring allies. DOE/NNSA will also engage foreign partners to develop and improve their capacities to prevent, counter, and respond to regional or local nuclear dangers. DOE/NNSA will continue to steward and sustain ST&E capabilities, its workforce, and the infrastructure systems resident in the nuclear security enterprise to overcome these threats, vulnerabilities, and challenges.



Mounted security patrol the vast 1,360-square-mile Nevada National Security Site. Security Police Officers provide a critical role in assuring the site's national security mission work is achieved in both a safe and secure manner.

"Now, at this pivotal moment, we continue to face serious challenges to our national security, even as we are working to shape the opportunities of tomorrow. Violent extremism and an evolving terrorist threat raise a persistent risk of attacks on America and our allies. Escalating challenges to cybersecurity, aggression by Russia, the accelerating impacts of climate change, and the outbreak of infectious diseases all give rise to anxieties about global security. We must be clear-eyed about these and other challenges and recognize the United States has a unique capability to mobilize and lead the international community to meet them."

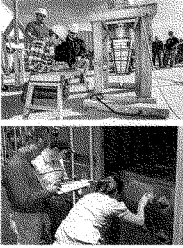
*National Security Strategy*  
(February 2015)



A DOE/NNSA Security Police Officer participates in a live fire exercise. Protective force members are trained to defend national security assets in a variety of field and urban environments.



## DOE/NNSA Mission

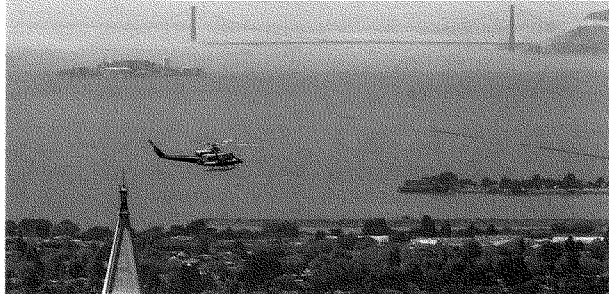


(top) Final preparations for a B61-12 impact test using Sandia National Laboratories' Davis gun at New Mexico Tech in Socorro.

(bottom) A DOE/NNSA inspection of a weapons-of-mass-destruction-related, dual-use, commodity shipment.

"We also will advance the President's vision for reducing the levels of nuclear weapons in the world, strengthen nonproliferation efforts, and combat nuclear terrorism. DOE must maintain a safe, secure, and effective nuclear weapons stockpile in the absence of nuclear testing and manage the infrastructure for the research, development, and production activities needed to meet national security requirements. We will carry out our responsibilities for safety and security, in accordance with the Administration's Stockpile Stewardship and Management Plan, which lays out a comprehensive modernization plan to ensure that our nuclear arsenal remains an effective deterrent."

*Department of Energy  
Strategic Plan for 2014-2018*



The Aerial Measuring System (AMS) provides nationwide emergency response services using both helicopter and fixed-wing aircraft. This AMS helicopter is conducting a mission on behalf of the U.S. Department of Homeland Security's Domestic Nuclear Detection Office.

DOE/NNSA is working with its interagency partners to address the following:

- **U.S. Strategic Deterrence.** As long as nuclear weapons exist, the United States must maintain resilience against emerging threats and ensure an effective, survivable nuclear deterrent in coming decades.
- **Extended Deterrence and Regional Conflict.** Continuing success in extended deterrence necessitates development of strategies to address the growing complexities of regional conflict, including cross-domain attacks and a lower threshold for adversary use of nuclear weapons.
- **Nuclear Proliferation and Terrorism.** This trend underscores the importance of efforts to deter, detect, and monitor both horizontal and vertical nuclear proliferation. It also requires capabilities to prevent, counter, and respond to nuclear and radiological dangers domestically and to improve capacity abroad, including partnering with third-party states where bilateral access is not an option.
- **The National and Nuclear Security Nexus.** The natural and increasingly significant synergy between the nuclear weapons mission and the broader global security missions is essential for the United States to ensure the preeminence of its nuclear weapons and nuclear threat reduction programs and capabilities to enable multidisciplinary technical solutions to other complex and high-risk national security challenges. Leveraging and maintaining capabilities that will provide the agility required to meet emerging national security challenges will be critical.

## DOE/NNSA Mission and the 21<sup>st</sup> Century Nuclear Security Enterprise

### CORE VALUES

Focused, United, Scientific, Innovative, Open, National (FUSION). These are the six core values that drive DOE/NNSA's purpose and reflect its deeply held beliefs.

<b>Focused</b>	— on the mission first, people always
<b>United</b>	— as a team with integrity and inclusiveness
<b>Scientific</b>	— solutions for the Nation
<b>Innovative</b>	— ideas to lead and improve
<b>Open</b>	— communication with transparency and trust
<b>National</b>	— service, safety and security

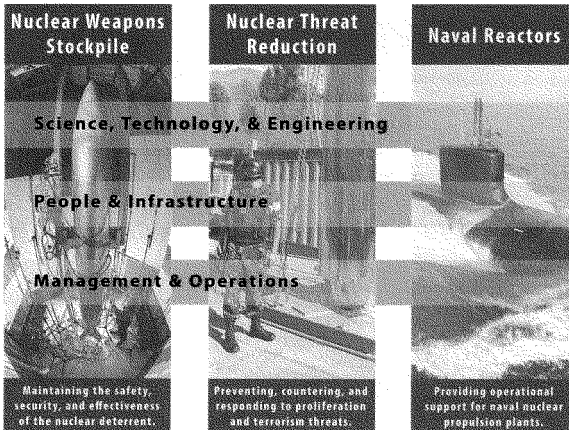
## DOE/NNSA Mission

DOE/NNSA's mission is implemented by a focused and united workforce that operates with integrity, the highest ethical standards, and respect for each other. Science and innovation are key to this mission. DOE/NNSA works with its laboratory, production facility, and site partners to maintain and grow the core scientific, technical, and engineering capabilities. Its values are executed by a team of Federal and contractor employees who openly communicate with trust and transparency. DOE/NNSA owes it to the Nation to always do the right thing, with safety and security at the forefront. FUSION defines DOE/NNSA's organizational ideals and identity and is its guiding principle for the future.

## MISSION PILLARS AND CROSSCUTS

DOE/NNSA's core missions and the capabilities and resources that enable mission delivery are represented as pillars and crosscuts. The three mission pillars are: the Nuclear Weapons Stockpile, Nuclear Threat Reduction, and Naval Reactors. These pillars are supported by three crosscutting capabilities: ST&E; People and Infrastructure; and Management and Operations. Each pillar and crosscut is integrated through the application of science and technology to national security challenges.

## APPLYING TECHNICAL CAPABILITIES TO NATIONAL SECURITY CHALLENGES



## Pillar 1: Nuclear Weapons Stockpile

DOE/NNSA is charged with supporting the Nation's strategic deterrent by maintaining a safe, secure, and effective nuclear weapons stockpile that will deter any adversary and guarantee the defense of the Nation and its allies. This is done in accordance with policy guidance to not produce new nuclear weapons, support new

## MISSION STATEMENT

"To ensure nuclear security by maintaining the nuclear weapons stockpile, reducing global nuclear dangers, and providing for naval nuclear propulsion."



"Meeting our mission can only be accomplished with a superb technical base. This base must include resources for basic science to drive technical solutions to security challenges – both today and for decades to come.

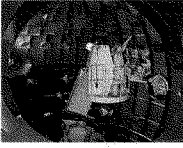
That is why it is vitally important for us to assign the highest priority to maintaining the core scientific, technical, and engineering capabilities of the Nation's nuclear enterprise."

Frank G. Klotz  
Under Secretary for  
Nuclear Security and  
Administrator, NNSA

## VISION STATEMENT

"Through world-class science and technology solutions, we will advance global nuclear security. We are a workforce committed to ensuring national security and to delivering effective management and operational excellence across an integrated enterprise."

## DOE/NNSA Mission



The National Ignition Facility (NIF) is the world's largest and highest-energy laser system. Its 192 beams can deliver 1.8 million joules of laser energy to a target about twice the size of a pencil eraser in less than a billionth of a second. In doing so, NIF can create conditions in the laboratory similar to those in stars and nuclear weapons, which allows DOE/NNSA to understand the stockpile without nuclear explosive testing.



DOE/NNSA's strategy to develop an exceptional workforce includes its Graduate Fellowship (NGFP) Program and its Minority Serving Institution Intern Program (MSIIP). The NGFP provides a year-long immersion in the DOE/NNSA workforce to selective fellows from exceptional academic institutions across the Nation. Over 80 percent of program alumni have been hired for Federal positions at DOE/NNSA Headquarters and sites, as well as other Federal agencies. The MSIIP affords underserved populations with opportunities in practical work experience within DOE/NNSA.

military missions, provide for new military capabilities, or conduct underground nuclear explosive tests. Sustaining the nuclear weapons currently in the stockpile, while extending the life of a reduced number of weapons anticipated for the future, demands a carefully balanced and executed Stockpile Stewardship and Management Program. This program consists of surveillance and assessment activities; maintenance; sustainment efforts such as life extension programs (LEPs), alterations (Alts), and modifications (Mods); dismantlement and disposition; and enabling base capabilities and materials development.

#### Pillar 2: Nuclear Threat Reduction

A core mission of DOE/NNSA continues to be reducing global nuclear dangers. This is done by engaging countries and advancing capabilities to prevent, counter, and respond to nuclear and radiological proliferation and terrorism threats and incidents worldwide. DOE/NNSA plays a central role in this mission, in coordination with its interagency partners. In a complex and dynamic nuclear security environment, DOE/NNSA applies its nuclear nonproliferation, counterterrorism, counterproliferation, and emergency response capabilities across the entire nuclear threat spectrum, from intent through crisis response.

#### Pillar 3: Naval Reactors

DOE/NNSA provides the design and development support required to equip U.S. Navy vessels with militarily effective nuclear propulsion plants and to ensure their safe, reliable, and long-lived operation. DOE/NNSA is responsible for reactor plant design and development for the next-generation ballistic missile submarines, attack submarines, and aircraft carriers; providing constant operational support to resolve any problems that arise with the nuclear-powered fleet while at sea; and providing the infrastructure needed to train nuclear-qualified sailors.

#### Crosscut 1: Science, Technology and Engineering

DOE/NNSA conducts world-class specialized research, development, testing, and evaluation activities using unique diagnostic tools, experimental platforms, and modeling and simulation architectures. From some of the world's fastest supercomputers to high-energy-density lasers and experimental test beds, the nuclear security enterprise delivers innovative and transformative scientific and technical solutions to the global challenges of the 21st century.

Beyond direct mission support, these capabilities deliver solutions for broader national security challenges. DOE/NNSA works in partnership across the U.S. Government, academia, and industry to advance its platforms and capabilities and to be better prepared for future technological surprise.

#### Crosscut 2: People and Physical Infrastructure

The people and physical infrastructure that make up the nuclear security enterprise are fundamental to executing DOE/NNSA's mission.

**People.** Success in the nuclear security enterprise depends on a highly capable workforce with specialized skills in a broad array of technical fields. The workforce is comprised of experienced executives and mid-career professionals, as well as entry-level talent.

DOE/NNSA is keenly aware that it must invest in a qualified, responsible, and committed workforce to fulfill its mission. Recruiting, retaining, and training today and tomorrow's workforce in essential areas of expertise are critical to mission delivery. DOE/NNSA, with its M&O partners and its non-M&O contracting partners, will devote extensive efforts to developing its Federal and contractor workforce to support the mission.

**Physical Infrastructure.** To meet current and future demands, DOE/NNSA requires specialized programmatic and general-purpose infrastructure. DOE/NNSA is modernizing and rightsizing its infrastructure by maintaining and repurposing existing facilities; dispositioning excess facilities in a timely manner; and building new facilities when necessary. Specialized facilities and equipment for commodities (such as uranium, plutonium, tritium, lithium, high explosives, and microelectronics) and the general-purpose infrastructure to enable safe, secure, and reliable operations are required to meet the mission. DOE/NNSA is deploying new enterprise-wide risk management tools to prioritize efforts to arrest the declining state of its infrastructure.

### Crosscut 3: Management and Operations

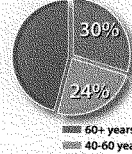
In order for DOE/NNSA to deliver products that meet its mission priorities, attention to clear, accountable, effective management and safe, secure, efficient operations is critical at all levels. DOE/NNSA is committed to ensuring safety and security, delivering quality projects on schedule and on budget, and providing timely best-value acquisition solutions.

To ensure safe, secure, and efficient operations, DOE/NNSA deploys layers of physical security, safeguards and security personnel, and sophisticated cyber security systems to protect the workforce, materials, infrastructure, and sensitive information essential to ensuring mission success. To meet its responsibility for protecting the most-sensitive weapons, materials, and information on Earth, DOE/NNSA will maintain graded physical and cyber security programs consistent with current threats and potential consequences. DOE/NNSA will ensure a robust Defense Nuclear Security Program with clear and consistent lines of responsibility and accountability. New and emerging threats, including increasing and more-sophisticated cyber-attacks, will require ongoing vigilance and state-of-the-art security systems. Safety operations include supporting safe, efficient material operations, as well as packaging and transport of sensitive materials. This includes compliance with environmental, safety, health, and quality requirements and improving the physical infrastructure.

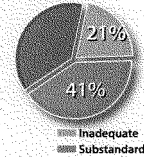
DOE/NNSA will work to continuously improve its project management across the nuclear security enterprise, in partnership with the leadership at its contractor-operated sites. DOE/NNSA is focused on building a culture of accountability and delivering results to meet its mission goals while providing best value to the taxpayer. DOE/NNSA will continue systematically strengthening its cost estimating capabilities and project management and acquisition systems. Fully establishing DOE/NNSA's budgeting and program evaluation capabilities will be critical for both mission success and proper stewardship of taxpayer dollars. Additionally, DOE/NNSA will ensure contract structures and incentives are cost-effective and will hold its contractors accountable to the terms and conditions of its contracts.

### THE CHALLENGE: AGE AND DECLINING INFRASTRUCTURE

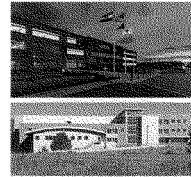
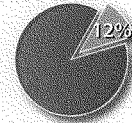
#### AGE OF FACILITIES



#### CONDITION OF FACILITIES



#### EXCESS FACILITIES



Notable infrastructure accomplishments include:

(top) The recent relocation of non-nuclear manufacturing operations from the Bannister Federal Complex site in Kansas City to the new Kansas City National Security Campus.

(bottom) The construction of the Radiological Laboratory Utility Office Building at Los Alamos National Laboratory.

Both projects were completed on time and under budget.

## DOE/NNSA Mission

DOE/NNSA is responsible for developing and implementing security programs including protection, control, and accounting of materials, as well as physical and cyber security for all DOE/NNSA facilities. The security mission is an integral and enabling component of the nuclear security enterprise that is designed to be flexible, efficient, innovative, and collaborative to effectively meet the challenges of rapidly evolving national security threats.



Lawrence Livermore National Laboratory



Los Alamos National Laboratory



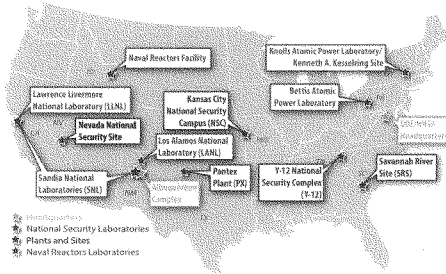
Sandia National Laboratories



Y-12 National Security Complex



Pantex Plant



### The Nuclear Security Enterprise

#### ENTERPRISE ROLES AND RESPONSIBILITIES

**Headquarters Operations.** DOE/NNSA manages its mission from its Headquarters in Washington, DC; Germantown, Maryland; and the Albuquerque Complex, which is collocated with Kirtland Air Force Base, in New Mexico. Federal Field Offices at each DOE/NNSA site provide tailored contract management, oversight, and collaboration with M&O partners. DOE/NNSA Headquarters is responsible for planning, managing, and overseeing the entire nuclear security enterprise.

**National Security Laboratories.** The core responsibility of the three national security laboratories remains to ensure the safety, security, and effectiveness of the Nation's nuclear deterrent. This is accomplished through basic and applied scientific research, systems engineering, experiments, assessments, and validation activities. Lawrence Livermore National Laboratory and Los Alamos National Laboratory serve as the nuclear weapons design agencies for the nuclear explosives package and have specific production missions as well. Sandia National Laboratories is responsible for development, testing, and production of specialized non-nuclear components and systems engineering for the entire nuclear stockpile. The science and engineering capabilities of each laboratory are being applied to achieve breakthroughs in areas beyond stockpile stewardship, including counterterrorism and nonproliferation, defense and intelligence, energy, and environmental security.

DOE/NNSA also conducts significant global security work at DOE laboratories, several of which have historic roles in nuclear fuel cycle issues, including Pacific Northwest National Laboratory, Oak Ridge National Laboratory, Argonne National Laboratory, Idaho National Laboratory, Brookhaven National Laboratory, and Savannah River National Laboratory.

**Nuclear Weapons Production Facilities.** Four nuclear weapons production facilities contribute to the mission of the nuclear security enterprise. The Y-12 National Security Complex manufactures, evaluates, and tests uranium and lithium for nuclear weapons components; dismantles, stores, dispositions, and down-blends highly enriched uranium (HEU); supports nonproliferation and counterterrorism activities; and provides enriched uranium for the U.S. Navy and for research reactors. The Pantex Plant assembles and dismantles nuclear weapons; manages high-explosive components; provides interim storage and surveillance of plutonium components; and

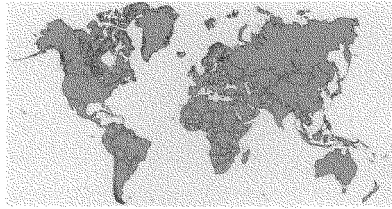
provides hardware and expertise for broader national security challenges. The Kansas City National Security Campus is responsible for manufacturing and procuring non-nuclear weapon components, including electronic, mechanical, and engineered material. The Savannah River Site processes uranium and plutonium to meet DOE/NNSA's nonproliferation goals and produces tritium for the nuclear stockpile.

**National Security Site.** The Nevada National Security Site supports high-hazard operations, testing, and training across DOE/NNSA's missions. This site also provides diagnostics and instrumentation, data analysis, and materials storage; conducts criticality experiments; provides research test beds for nuclear nonproliferation and counterterrorism activities; and supports low-level radioactive waste material disposition.

**Naval Reactors Laboratories.** The Bettis and Knolls Atomic Power Laboratories conduct research and design work that ensures the safe, reliable, and long-lived operation of nuclear propulsion plants. The Kenneth A. Kesselring Site operates two prototype nuclear reactors for the operational testing of new designs and new technologies and provides vital hands-on training for naval reactor plant operators. The Naval Reactors Facility at Idaho National Laboratory prepares, examines, and processes all naval nuclear spent fuel into dry storage for shipment and supports refueling and defueling of nuclear-powered U.S. Navy vessels.

**International Engagements.** Nuclear security is a global issue that requires international partnership on safety, security, and technical and policy issues.

DOE/NNSA is engaged in over 130 countries around the world to collaborate and build the capacity of foreign partners to prevent, counter, and respond to nuclear dangers. DOE/NNSA has personnel stationed in China; France; Japan; Kazakhstan; Pakistan; Russia; Ukraine; the U.S. Mission to the International Organizations



DOE/NNSA engagements worldwide

in Vienna, Austria; the Organization for Economic Cooperation and Development in Paris, France; and a Regional Office in Bulgaria.

#### BROAD NATIONAL SECURITY IMPACT

DOE/NNSA is committed to strategically managing and facilitating strategic partnerships that strengthen the synergies between its core capabilities and broader national security needs. These strategic partnerships attract and retain outstanding people and are necessary to sustain critical tools and facilities. DOE's science and energy programs, as well as Strategic Partnership Projects with the U.S. Department of Defense (DOD), U.S. Department of Homeland Security, and other national security agencies in areas such as cyber security, weapons of mass destruction, and advanced conventional weapons, leverage DOE/NNSA's national assets and represent a more efficient use of Government resources. Interactions with the private sector allow for commercialization and deployment of DOE/NNSA-developed technologies that meet DOE's technology transfer mission and contribute to U.S. competitiveness and economic goals.



Kansas City National Security Campus



Savannah River Site



Nevada National Security Site



Kenneth A. Kesselring Site



Knolls Atomic Power Laboratory



Bettis Atomic Power Laboratory



Naval Reactors Facility

## Strategic Priorities and the Way Ahead

### NUCLEAR WEAPONS STOCKPILE GOALS

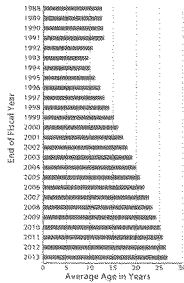
- Complete W76-1 production by 2019.
- Complete B61-12 first production unit by 2020.
- Complete W88 Alt 370 with a refreshed conventional high explosive first production unit by 2020.
- Complete W80-4 first production unit by 2025.
- Accelerate the dismantlement of weapons retired prior to FY 2009.
- Cease programmatic operations at the Chemistry and Metallurgy Research facility at Los Alamos National Laboratory by 2019.
- Cease enriched uranium programmatic operations in Building 9212 at the Y-12 National Security Complex by 2025.
- Ensure capability to produce 50 to 80 pits per year by 2030.
- Provide experimental and computational capabilities to support stockpile certification.

## Strategic Priorities and the Way Ahead

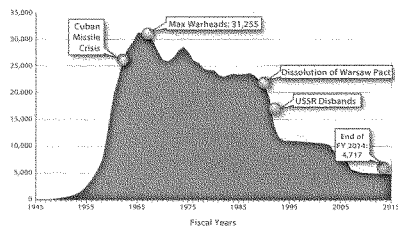
### NUCLEAR WEAPONS STOCKPILE

Maintaining a safe, secure, and reliable nuclear weapons stockpile, without underground nuclear explosive testing, is the highest priority for the Nuclear Weapons Stockpile mission pillar. DOE/NNSA has successfully sustained the deterrent since the unilateral moratorium on nuclear explosive testing in 1992 and will continue to do so through the Stockpile Stewardship and Management Program. This has been accomplished through the capabilities, vision, and determination of DOE/NNSA's world-class scientists, technicians, and engineers, as well as significant investment in scientific tools, facilities, and people. Sustaining the nuclear weapons stockpile includes a range of priority activities that are interdependent.

Average Stockpile Age, 1988 – 2013



U.S. Nuclear Stockpile, 1945 – 2014  
(Includes active and inactive warheads. Several thousand additional nuclear warheads are retired and awaiting dismantlement)

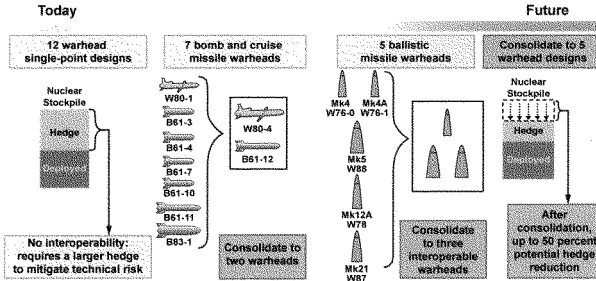


**Surveillance and Assessment.** Surveillance is the process whereby individual weapons undergo inspections and tests to ensure they meet safety, security, and reliability requirements. To meet future surveillance and assessment requirements, DOE/NNSA will improve aging models, deploy improved diagnostics, and use advanced evaluation techniques.

**Maintenance.** This process includes limited-life component exchanges, *i.e.*, planned periodic exchanges of components as they reach the end of their lives, to sustain system functionality. DOE/NNSA will work with DOD to jointly manage delivery and installation of replacements before warhead performance or personnel safety is adversely affected.

**Sustainment.** As weapons systems age, life extension, alteration, and modification programs are addressing aging and performance issues, enhancing safety features, and improving security. DOE/NNSA will meet strategic deterrence requirements with a reduced stockpile size while retaining reliability. To meet national policy for a safe, secure, and effective stockpile as long as nuclear weapons exist, sustainment is necessary to maintain the operational capability. The "3+2" Strategy is the program of record that guides DOE/NNSA's sustainment efforts, which will eventually downsize the stockpile through the sustainment process.

## Strategic Priorities and the Way Ahead



The "3+2" Strategy is what guides DOE/NNSA's sustainment efforts.

Ongoing sustainment efforts include the following highlights. Production of the W76-1 LEP will enable reduction of W76 warheads by a factor of two. The B61-12 LEP will consolidate four families of the B61 bomb into one and improve both the safety and security of the oldest weapon system in the U.S. arsenal. Once B61-12 production is complete (by FY 2025) and confidence is achieved, the B83—the last megaton-class weapon in America's arsenal—will be retired. As agreed upon by the Nuclear Weapons Council, DOE/NNSA will remain focused on delivering the W80-4 warhead LEP for the cruise missile; the W88 Alt 370, including refreshment of the conventional high-explosive main charge; and the first interoperable warhead with a common nuclear explosive package and common or adaptable non-nuclear components to allow for further stockpile reductions.

**Dismantlement and Disposition.** Weapons are retired as a result of changes to military requirements or as a result of surveillance evaluations. The dismantlement and disposition process includes disassembling the weapons and storing, recycling, disposing of, or reusing their major components. DOE/NNSA will continue to meet its commitment to dismantle, by FY 2022, weapons systems retired prior to FY 2009. As announced at the 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, the United States will seek to accelerate the dismantlement of retired warheads by 20 percent. DOE/NNSA will work to balance workload requirements between LEP and dismantlement activities.

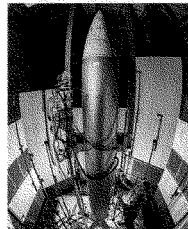
**Base Capabilities and Materials.** DOE/NNSA identifies and pursues the research and advanced development necessary to achieve advances in modern weapon safety and security, production, qualification, surveillance, and dismantlement. This work enables agility and positions DOE/NNSA to respond to technological surprise.

These interdependent priority activities are accomplished only through reliance on DOE/NNSA's three unique crosscutting capabilities for supporting and maintaining a safe, secure, and reliable nuclear weapons stockpile.

**ST&E Supporting the Stockpile.** Since the cessation of U.S. nuclear weapons testing in 1992, DOE/NNSA has maintained the nuclear stockpile through the science-based Stockpile Stewardship Program. DOE/NNSA will continue to use and reinvest in its suite of innovative experimental platforms, diagnostic equipment, and



The Annual Assessment Process is the method used by DOE/NNSA and DOD to evaluate the safety, reliability, performance, and military effectiveness of the nuclear weapons stockpile. The Directors of the three DOE/NNSA national security laboratories are required to complete Annual Assessments, and the Commander of U.S. Strategic Command provides an assessment of the military effectiveness of the stockpile. The Secretaries of Energy and Defense are required to submit these reports unaltered to the President, along with any conclusions the Secretaries consider appropriate.



An engineer at Sandia National Laboratories prepares for an acoustic test on a B61-12 system. The unit is surrounded by banks of speakers that expose it to an acoustic field. The sound pressure reaches 131 decibels, similar to a jet engine.



## Strategic Priorities and the Way Ahead

Sustainment programs are classified into three categories: An alteration (Alt) is a limited scope change that typically affects the assembly, testing, maintenance, and/or storage of weapons. An Alt may address identified defects and component obsolescence, but does not change a weapon's operational capabilities. A modification (Mod) is a more-comprehensive modernization program that changes the operational capabilities of the weapon. A Mod may enhance weapons' margins against failure, increase safety, improve security, extend limited-life component life cycles, and/or address identified defects and component obsolescence. A life extension program (LEP) is a modification that refurbishes warheads by replacing aged components to extend the service life of the weapon. LEPs can extend the life of a warhead 20 to 30 years, while increasing safety, improving security, and addressing defects.



Advanced simulation and computing codes address physical regimes that cannot be tested to address anomalous situations.

computational capabilities to ensure stockpile safety, security, and reliability. DOE/NNSA will also continue to prioritize ST&E activities and capabilities to address today's concerns regarding the aging stockpile; ensure future technical and predictive capabilities are available, including concepts for sustainment options such as component reuse; and explore and apply new additive manufacturing processes to perform mission support activities.

Additionally, new experimental facilities are under consideration to improve the understanding of materials in nuclear weapons. As long as the nuclear stockpile exists, DOE/NNSA will strengthen the ST&E base needed to sustain the nuclear deterrent and modernize safety and security features.

**People and Infrastructure Supporting the Stockpile.** Stockpile stewardship and management activities would not be possible without the recruitment, retention, and training of a highly skilled, technically focused, and disciplined workforce. DOE/NNSA will continue to support the Laboratory and Plant Directed Research and Development activities to continue challenging its existing workforce and attracting the next generation of talent.

In addition, DOE/NNSA is working to rightsize and modernize its aging infrastructure in a coordinated fashion and has formulated strategies for recapitalizing key capabilities within the complex. For example, DOE/NNSA is implementing a disciplined, modular approach for the Plutonium and Uranium Strategies to ensure continuation of the Nation's plutonium and uranium capabilities in pit production and uranium manufacturing. This will allow DOE/NNSA to leverage its existing infrastructure by tailoring safety basis changes and repurposing existing facilities while ensuring new construction is appropriately scaled to the necessary program and safety requirements.

**Management and Operations Supporting the Stockpile.** DOE/NNSA is implementing the Defense Programs Cost Improvement Initiative, consistent with industry and Government Accounting Office best practices, along with infrastructure program management tools to align resource allocations with priorities and improve decision-making. This effort is aimed at improving the efficiency and cost-effectiveness of weapon programs. DOE/NNSA will remain mindful of the critical need for effective and efficient physical and cyber security to ensure the protection, control, and accountability of nuclear materials, as well as the protection of classified and sensitive information.



DOE/NNSA applies its engineering and manufacturing expertise to make arming, fuzing, and firing systems less expensive and more reliable.

## NUCLEAR THREAT REDUCTION

No threat poses as grave a danger to the Nation's security and well-being as the potential use of nuclear weapons and materials by irresponsible states or terrorists. Preventing and countering nuclear proliferation while protecting national interests around the globe against the threat of nuclear and radiological terrorism are key U.S. national security strategic objectives that require constant vigilance. DOE/NNSA applies its nuclear nonproliferation, counterterrorism, counterproliferation, and emergency response capabilities across the entire threat spectrum by following three general philosophies: Prevent, Counter, and Respond to global nuclear dangers.

DOE/NNSA prevents the illicit acquisition and/or development by state and non-state actors of weapons-usable nuclear or radiological materials, equipment, technology, and expertise. This is executed through the following strategic activities.

**Material Management and Minimization.** DOE/NNSA seeks to achieve permanent threat reduction by minimizing and, when possible, eliminating excess weapons-usable nuclear materials around the world, as well as by ensuring sound material management principles are applied in the peaceful use of remaining nuclear materials. This is accomplished by converting reactor and isotope production facilities to non-weapons-usable nuclear materials both domestically and abroad; removing or confirming the disposition of excess weapons-usable material at civilian facilities across the globe and consolidating those that remain; and disposing and managing weapons-usable nuclear material, from both domestic stockpiles and material returned from abroad, and implementing the Plutonium Management Disposition Agreement with Russia.

**Global Material Security.** Where elimination is not possible, DOE/NNSA ensures that remaining nuclear and radiological materials worldwide are secured, protected, and kept under control and accounted for in accordance with internationally accepted recommendations. This includes replacing vulnerable radiological sources used in the private sector, where feasible, and removing disused sources from civilian sites, thus



Radiation portal monitors along a rail line scan a train for the illicit trafficking of radioactive and special nuclear material.

## NUCLEAR THREAT REDUCTION GOALS

- Remove and dispose of an additional 1,553 kilograms of vulnerable nuclear materials by 2020.
- Convert or verify the shutdown of 26 additional research reactors and isotope production facilities by 2020.
- Provide protection upgrades of approximately 2,600 radiological material buildings by 2020.
- Improve export control systems in 40 countries by 2020.
- Demonstrate advanced capabilities to detect special nuclear materials and continuously monitor nuclear weapons by 2018.
- Complete the experimental validation of the national predictive modeling capability by 2020.
- Maintain the emergency operations readiness index at 91 or higher.
- Dispose of 34 metric tons of plutonium under the Plutonium Disposition Management Agreement.

## Strategic Priorities and the Way Ahead



The Nuclear Security Summit series, initiated in 2010 and held every two years, brings together heads of state to raise awareness about nuclear security issues. At the 2014 Summit held in The Hague, the United States and Japan pledged to remove and dispose of all highly enriched uranium (HEU) and separated plutonium from Japan's Fast Critical Assembly facility—an initiative that DOE/NNSA will be executing. The next Summit will be held in the United States in 2016.



In July 2013, DOE/NNSA's Office of Defense Nuclear Nonproliferation completed the removal of 11 kilograms of HEU from the Dalat Nuclear Research Institute. Special casks containing the last of Vietnam's HEU are loaded onto an An-124 for transport to Russia.

reducing the long-term need for sustainable security at sites with radioactive sources. Additionally, DOE/NNSA trains and equips countries around the world to detect and deter illicit movement of nuclear weapons, proliferation-sensitive materials, and radiological sources.

**Nonproliferation Policy and Arms Control.** To complement its efforts to strengthen the nuclear security regime, DOE/NNSA also seeks to strengthen the implementation and effectiveness of the global nonproliferation and arms control regimes and bodies that govern that global effort, including the Nuclear Non-Proliferation Treaty, the International Atomic Energy Agency (IAEA), and the Nuclear Suppliers Group. DOE/NNSA's programs in this area aim to prevent the diversion or proliferation of sensitive and/or dual-use materials, equipment, technology, and expertise by improving nuclear safeguards and export controls around the world and the monitoring, transparency, and verification of nonproliferation and arms control treaties and agreements.

**Nonproliferation Research and Development.** To enable all of these efforts, DOE/NNSA leads advanced research and development initiatives that seek to create effective technologies to detect nuclear detonations and discover foreign nuclear weapons development activities. DOE/NNSA works to advance technologies to strengthen monitoring and verification of foreign commitments to nonproliferation and arms control treaties and agreements. DOE/NNSA also conducts fundamental research in support of counterterrorism and emergency response missions to improve nuclear forensics and material detection capabilities.

**Counterterrorism.** DOE/NNSA uses its technical expertise and enterprise capabilities to counter the efforts of both state and non-state actors to steal, acquire, develop, disseminate, transport, or deliver the materials, expertise, or components necessary for a nuclear or radiological threat device, or the weapons themselves. These nuclear counterterrorism and counterproliferation activities develop the scientific and technical understanding required to characterize, detect, and defeat the range of nuclear devices that are potentially available to a non-state actor. In addition, DOE/NNSA strengthens nuclear counterproliferation strategies that would be employed after state actors have (or are presumed to have) obtained nuclear materials, technologies, or devices. DOE/NNSA also sustains international leadership through cooperative efforts with other nations to improve technical understanding and countermeasures to nuclear and radiological terrorism threats and vulnerabilities. Based on this work, the teams that ultimately respond to an incident can confidently assess and render safe these threat devices.

**Emergency Response.** At the end of the nuclear threat reduction spectrum, DOE/NNSA's Emergency Response



Nearly 200,000 first responders from across the United States have trained in realistic settings at the Nevada National Security Site. Hands-on experience in using equipment, understanding radiation protection, and public safety are taught so these responders are better suited to protect the communities in which they work and live.

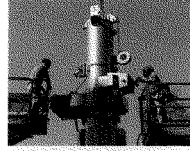
technical and operational capabilities are fully prepared to respond if a nuclear or radiological accident or incident were to occur anywhere in the world. DOE/NNSA maintains a wide range of capabilities in the core areas of crisis operations, consequence management, and emergency management to search, assess, render safe, and/or manage and contain the consequences of an accident or incident. DOE/NNSA's deployable assets, emergency management operations, and national-level and interagency integrated counterterrorism capabilities leverage both DOE's and DOE/NNSA's scientific and technical operational support capabilities to save lives, protect property and the environment, and meet basic human needs.

All of these important global threat reduction programs rely on the key crosscutting capabilities that make DOE/NNSA a unique and effective organization to address global nuclear security issues.

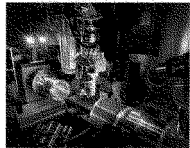
**ST&E Supporting Nuclear Threat Reduction.** The ST&E capabilities that reside across the nuclear security enterprise and the greater DOE complex are leveraged to perform the research and development required to address the challenges and potential consequences of nuclear and radiological proliferation and terrorism. This research and development advances U.S. capabilities to detect proliferation, monitor detonations, verify treaties, and interdict smuggled nuclear materials in support of the nuclear threat reduction pillar. The deep technical knowledge of DOE/NNSA laboratories and sites regarding how weapons and materials work underpins research and development related to characterization and forensics abilities and prepares the United States to respond to nuclear or radiological accidents or incidents anywhere in the world. Information gained from decades of nuclear weapon research is combined with newer experimental data to model improvised nuclear device designs and improve confidence in global monitoring of low-yield underground explosions.

**People and Infrastructure Supporting Nuclear Threat Reduction.** Through DOE/NNSA's policy and technical expertise, it conducts global nuclear security engagement and capacity-building training activities with its more than 130 partners around the world. Through multilateral forums, including the International IAEA, international summits, and the Nuclear Security Summit process, DOE/NNSA's workforce is at the forefront of raising awareness of threats and building technical and policy capabilities to prevent, counter, and respond through a suite of global security engagement programs and cooperative activities. This effort includes leveraging DOE/NNSA's unique production facility infrastructure to minimize the use of HEU in civilian applications. DOE/NNSA facilities support the conversion of research reactors to the use of non-weapons-usable materials; temporary storage of high-risk repatriated material; and, ultimately, down-blending and disposition of nuclear materials to achieve permanent threat reduction.

**Management and Operations Supporting Nuclear Threat Reduction.** This mission activity would not be possible without the application of safe, secure, and efficient management and operation principles to DOE/NNSA's global engagement efforts and project execution. Through independent validation of its disposition options, DOE/NNSA is working to more efficiently manage the disposition of surplus plutonium. DOE/NNSA is sharing its best physical security practices with other states that may be developing civil or military nuclear infrastructure now or in the future.



From 2009 to 2013, President Obama launched an accelerated effort to secure and eliminate vulnerable nuclear materials around the globe. Working with the IAEA, Russia, and other partners from April 2009 to December 2013, DOE/NNSA removed or confirmed the disposition of over 3,000 kilograms of U.S.- and Russian-origin HEU and separated plutonium from locations around the world. Over the life of these DOE/NNSA activities, HEU and separated plutonium have been removed or confirmed disposed from 40 countries plus Taiwan, with all HEU removed from 26 of those countries and Taiwan.



A robotic parting lathe, part of the Advanced Recovery and Integrated Extraction System (ARIES) at Los Alamos National Laboratory, disassembles plutonium pits from dismantled nuclear weapons before conversion of the nuclear material from metal to oxide form.

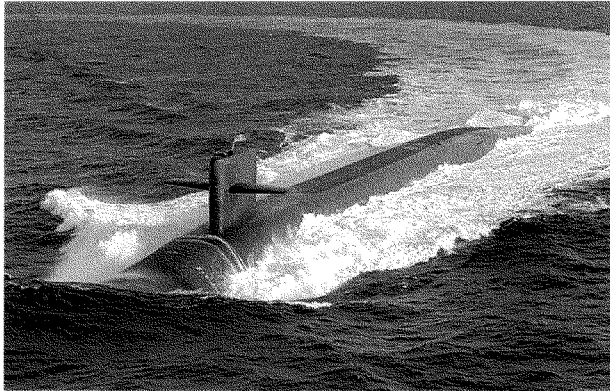
## Strategic Priorities and the Way Ahead

### NAVAL REACTORS GOALS

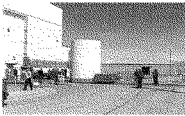
- Begin refueling and overhaul of the S8G land-based prototype by 2018.
- Provide the U.S. Navy with the M-290 shipping container unloading capability by 2024.
- Provide the U.S. Navy with an S1B reactor plant design that satisfies the stealth and power requirements of the next-generation ballistic missile submarine by 2027.

### NAVAL NUCLEAR PROPULSION

Supporting the U.S. Navy's ability to protect and defend American interests across the globe remains a critical mission priority for DOE/NNSA. To remain at the forefront of technological developments in nuclear propulsion, DOE/NNSA's Office of Naval Reactors (Naval Reactors) advances new technologies and improvements in performance and reliability to ensure a commanding edge in warfighting capabilities. Going forward, Naval Reactors will provide the U.S. Navy with an S1B reactor plant design that satisfies the stealth and power requirements of the next-generation ballistic missile submarine (the OHIO-Class replacement) by 2027. This reactor will be a life-of-the-ship core, which will eliminate costly mid-life refueling, increase operational availability, and enable the U.S. Navy to accomplish the sea-based leg of the strategic deterrent mission with 12 ballistic missile submarine platforms versus the 14 currently in inventory.



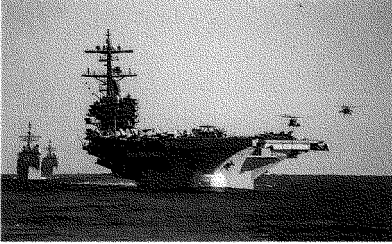
DOE/NNSA is responsible for the reactor plant design and development for the Ohio-Class ballistic missile submarine replacement.



In 2014, Naval Reactors packaged its 100th Spent Fuel Canister, representing over 50 percent of all Naval Reactors spent fuel placed in dry storage. The packaging method prepares fuel for transfer without further processing.

Naval Reactors also possesses the unique expertise and facilities to maintain "cradle to grave" responsibility for naval nuclear propulsion—from propulsion plant design to ultimate disposition. The 55-year-old Expended Core Facility, located at the Naval Reactors Facility at Idaho National Laboratory, is the only facility with the capability to receive naval spent nuclear fuel shipping containers and process naval spent nuclear fuel.

By 2024, the Spent Fuel Handling Recapitalization Project will provide initial M-290 shipping container unloading capability to support nuclear-powered aircraft carrier refueling and defueling schedules, thus maximizing the operational availability of the nuclear-powered fleet and minimizing steps required to prepare fuel for interim dry storage. This will ensure the fleet's longer-term ability to meet mission needs and maintain national security around the globe.



USS *George H.W. Bush* (CVN-77) conducts flight operations.

plant. By 2018, Naval Reactors will begin to refuel and overhaul the S8G land-based prototype, which will preserve a critical research and development asset that provides a cost-effective test and evaluation platform for new technologies, materials, and components before introduction into the fleet. These research capabilities and high training standards have contributed to exemplary safety and performance records for the U.S. Navy.

DOE/NNSA provides the U.S. Navy with safe, militarily effective, and reliable nuclear propulsion plants by relying on its three unique crosscutting capabilities for supporting Naval Reactors.

**ST&E Supporting Naval Reactors.** Since the inception of nuclear powered warships, Naval Reactors has made continuous advancements in warfighting capabilities such as endurance, stealth, and power through ST&E expertise and capabilities. Concerted ST&E investments are a key cornerstone of Naval Reactors' mission, helping to fully integrate the design, construction, operation, life-cycle support, and disposition functions that are necessary to deliver an enduring naval nuclear propulsion capability. Technology developed by Naval Reactors enables minimized life-cycle maintenance costs, prolonged operating life, and reduced manning requirements. Naval Reactors' use of high-performance computing platforms to improve predictive modeling capabilities to better anticipate and prevent emergent propulsion plant issues, as well as to prove future propulsion plant designs, will be critical into the future. Naval Reactors will prioritize the ST&E necessary to sustain the sea-based leg of the nuclear strategic deterrent and maintain nuclear assurance for the Nation and its allies by addressing today's concerns and looking into the future to ensure technical and predictive capabilities are available within the nuclear security enterprise.

**People and Infrastructure Supporting Naval Reactors.** The Naval Reactors mission is accomplished by a lean network of dedicated research laboratories, nuclear-capable shipyards, equipment contractors and suppliers, and training facilities that are coordinated by a Headquarters staff of nuclear technology experts who provide oversight and direction for all program elements.

Finally, Naval Reactors' unique training requirements are met by special-purpose facilities staffed by highly qualified instructors. These facilities include land-based prototypes that provide hands-on training and ensure that, before their first sea tour, all operators are qualified on an operating naval nuclear propulsion

The Bettis and Knolls Atomic Power Laboratories are research and engineering facilities devoted solely to naval nuclear propulsion work. With combined staffs of over 6,100 engineers, scientists, technicians, and support personnel, their mission is to develop the most advanced naval nuclear propulsion technology and to provide technical support for the continued safe, reliable operation of all existing naval reactors. Both of these laboratories also offer postgraduate research opportunities through the Naval Nuclear Propulsion Fellowship Program.



Since 1955, U.S. Navy nuclear-powered warships have steamed over 155 million nautical miles and amassed over 6,700 reactor-years of operating experience without a reactor accident or any release of radioactivity that has had an adverse effect on human health or the quality of the environment.

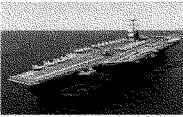


A technician at the Knolls Atomic Power Laboratory performs water hardness titration to monitor process cooling water for steam plants.

## Conclusion

About 45 percent of the Navy's major combatants are nuclear-powered:

- 14 ballistic missile submarines
- 4 cruise missile submarines
- 54 fast attack submarines
- 10 aircraft carriers



The USS Gerald R. Ford (CVN-78) next-generation aircraft carrier is outfitted with a new reactor plant that provides more generating capability and requires fewer reactor department sailors.

Management and Operations Supporting Naval Reactors. Through demanding technical excellence in research, operations, safety, and health, Naval Reactors continues to achieve operational efficiency in supporting the U.S. Navy, while maintaining the highest standards in the performance and safety of DOE/NNSA's personnel, all of which contributes to continued excellence in achieving DOE/NNSA's mission.

Naval Reactors also prioritizes the continued safety of operations and the health of its workforce, placing additional emphasis on reducing radiation exposure associated with naval nuclear propulsion plants to the lowest level reasonably achievable. In carrying out this policy, Naval Reactors has consistently maintained more-stringent exposure standards than those in the civilian nuclear power industry or in other Government nuclear programs. The program maintains the same rigorous attitude toward the control of radioactivity and protection of the environment as it does toward reactor design, testing, operation, and servicing. As a result, the program has a well-documented record showing the absence of any adverse environmental effect from the operation of U.S. nuclear-powered warships.

## CONCLUSION

DOE/NNSA ensures U.S. and global nuclear security every day by maintaining the nuclear weapons stockpile, reducing global nuclear dangers, and providing for naval nuclear propulsion through the application of world-class capabilities by its highly skilled workforce. To continue accomplishing its mission, DOE/NNSA must maintain its ST&E capabilities, support and sustain its people, modernize its physical infrastructure, and develop a management culture that is committed to continuous improvement in operating a safe, secure, and efficient nuclear security enterprise.

As DOE/NNSA follows this *2015 DOE/NNSA Enterprise Strategic Vision*, it will focus on meeting the challenges of today and a dynamic future. Regional and global trends, coupled with continuing fiscal realities, will make it imperative for DOE/NNSA to adapt more quickly and pursue more-innovative approaches and partnerships in response to these challenges.

Mr. KLOTZ. The budget materials and briefings we have provided describe NNSA's major accomplishments in the calendar year 2015, as well as the underlying rationale for our budget proposal for fiscal year 2017. Let me just briefly highlight a few points here.

First and foremost, the United States has maintained a safe, secure, and effective nuclear weapons stockpile without nuclear explosive testing for over 20 years. NNSA's fiscal year 2017 budget request continues a steady increase in the Weapons Activity appropriation. And in fact, this account has increased more than 40 percent since the fiscal year 2010 budget request. As a result of the funding provided by this Congress and supported by this subcommittee, and the significant improvements NNSA has made in program management over the past two to three years, all of our life extension programs are now on schedule and within budget.

NNSA's science and technology base also continues to yield critical modeling and simulation data and deploy increasingly capable high performance computing in support of stockpile stewardship. Last year, for example, the National Ignition Facility at Lawrence Livermore National Laboratory in California increased its shot rate—that is the number of experiments that it does—from 191 in 2014 to 357 in 2015, almost doubling the shot rate, including the first-ever experiments at NIF using plutonium.

Our budget request also supports the recapitalization of NNSA's aging research and production infrastructure. Most notably the facilities where we perform our major uranium, plutonium, tritium, and other commodity operations. Of significance, NNSA completed the first subproject, titled Site Readiness, for the Uranium Processing Facility on time and under budget.

This year's request for the Defense Nuclear Nonproliferation account is 6.8 percent lower than the fiscal year 2016 enacted level for two reasons. First, prior year carry over balances are available to execute several programs in this mission space. And second, we propose terminating the mixed oxide, or MOX Fuel Fabrication Facility project and pursuing a dilute and dispose approach as a faster, cheaper path to meeting our national commitment and international agreement to dispose of 34 metric tons of excess weapons grade plutonium.

The request for our third appropriations, the Naval Reactors programs, keeps pace with mission needs and continues NNSA's commitment to the three major initiatives undertaken by NR: The OHIO-Class Reactor Plant System development, the land-based S8G Prototype refueling overhaul taking place in upstate New York, and the spent fuel handling recapitalization project in Idaho. For each of these missions, NNSA is driving improvements in management and governance. For all of our programs, we have instituted rigorous analysis of alternatives, defining clear lines of authority and accountability for Federal and contractor program and project management, improved cost and scheduled performance, and ensure that Federal project directors and contracting officers have the appropriate skill mix and professional certifications to effectively manage NNSA's work.

Our budget request for the fourth appropriation, that is Federal Salaries and Expenses, reflects an increasing emphasis on improving program and project management across all our mission pillars.



So, in closing, the nuclear security enterprise continues to make significant progress, although as the Ranking Member pointed out, there is still work to be done. Through discipline, careful planning, consistent funding, and your continued strong support, we believe we can make smart investments to build on that progress and to meet new challenges in the future.

So, again, thank you for the opportunity to appear before you today. We all look forward to answering any questions you may have.

[The information follows:]

**Statement of Lt. Gen. Frank G. Klotz, USAF (Ret)  
Administrator  
National Nuclear Security Administration  
U.S. Department of Energy  
on the  
Fiscal Year 2017 President's Budget Request  
Before the  
Subcommittee on Energy and Water Development  
House Committee on Appropriations**

**March 1, 2016**

Chairman Simpson, Ranking Member Kaptur, and Members of the Subcommittee, thank you for the opportunity to present the President's Fiscal Year (FY) 2017 budget request for the Department of Energy's (DOE) National Nuclear Security Administration (NNSA). It is a pleasure to be here this afternoon. We value this Committee's strong support for the nuclear security mission, and for the people and institutions that are responsible for executing it.

The President's FY 2017 budget request for NNSA is \$12.9 billion, this is an increase of \$357.5 million or 2.9% over the FY 2016 enacted level. The request is approximately 43% of the DOE's total budget, and 67% of DOE's total O50 budget.

The NNSA has a unique and special responsibility to maintain a safe, secure, and effective nuclear weapons stockpile for as long as nuclear weapons exist; to prevent, counter, and respond to evolving and emerging nuclear proliferation and terrorism threats; to provide nuclear propulsion to our Navy as it protects American and Allied interests around the world; and to support our outstanding NNSA federal workforce. By supporting overall growth, this budget request represents a strong endorsement of NNSA's vital and enduring missions, and is indicative of the Administration's unwavering commitment to a strong national defense.

NNSA's missions are accomplished through the hard work and innovative spirit of a highly talented federal and Management and Operating (M&O) workforce committed to public service. To provide this team the tools they need to carry out their complex and challenging task, both now and in the future, we must continue to modernize our scientific, technical, and engineering capabilities and infrastructure. In doing so, we are mindful of our obligation to continually improve our business practices, and to be responsible stewards of the resources that Congress and the American people have entrusted to us.

The FY 2017 budget request also reflects the close working partnership between NNSA and the Department of Defense (DoD). NNSA works closely with DoD to meet military requirements, support our Nation's nuclear deterrence capabilities and modernize the nuclear security enterprise. I would also note, that as in previous years, DoD is carrying in its FY 2017 budget request separate funding in FY 2018 and beyond that will be reallocated annually to NNSA's Weapons Activities and Naval Reactors.

I want to thank the committee for its support of the FY 2016 budget request and look forward to your continuing support in FY 2017. We have made some tough decisions and tradeoffs to meet both military commitments and nuclear security priorities. Without congressional support, modernization of our nuclear enterprise, implementation of our long-term stockpile sustainment strategy, and sustainment of our nonproliferation and prevention and response capabilities could be at risk. The program we have proposed is highly integrated and interdependent across the four accounts.

Details of the FY 2017 budget request for the NNSA follow:

### **Weapons Activities Appropriation**

For the Weapons Activities account, the FY 2017 budget request is \$9.2 billion, an increase of \$396.2 million, or 4.5% above the FY 2016 enacted levels. This account provides funds for the Defense Programs portfolio, which is responsible for all aspects of the stockpile stewardship, management, and responsiveness programs; the enterprise-wide infrastructure sustainment activities managed by our Office of Safety, Infrastructure, and Operations; NNSA's physical and cybersecurity activities; and the secure transportation of nuclear materials.

### **Maintaining the Stockpile**

Last year, the work of the science-based Stockpile Stewardship Program (SSP) allowed the Secretaries of Energy and Defense to certify to the President for the 20<sup>th</sup> time that the American nuclear weapons stockpile remains safe, secure, and reliable, without the need for underground explosive nuclear testing. This achievement is made possible each year by essential investments in state-of-the-art diagnostic tools, high performance computing platforms, and modern facilities, which are staffed by NNSA's world-class scientists, engineers, and technicians.

For Directed Stockpile Work (DSW), the FY 2017 budget request is \$3.3 billion, a decrease of \$57.3 million, or 1.7% below the FY 2016 enacted levels. These reductions will not restrict NNSA's ability to annually assess system performance and reliability or maintain the schedule for Life Extension Programs (LEP).

The major LEPs are a fundamental part of this account. The \$222.9 million requested for the W76-1 warhead LEP directly supports the Navy and will keep the LEP on schedule and on budget to complete production in FY 2019. We continue to make good progress on the B61-12 LEP, which will consolidate four variants of the B61 gravity bomb and will improve the safety and security of the oldest weapon system in the U.S. nuclear arsenal. With the \$616.1 million requested, we will remain on schedule to deliver the First Production Unit (FPU) in FY 2020. NNSA is responsible for the refurbishment of the nuclear explosives package and new bomb electronics, while the Air Force will provide the tail kit assembly under a separate acquisition program. When fielded, the B61-12 bomb will support both Air Force strategic long-range

nuclear-capable bombers and dual-capable fighter aircraft, providing extended deterrence to our allies and partners, and allow retirement of the last megaton class weapon in the inventory, the B83 gravity bomb.

In July 2015, we began Phase 6.2 (Feasibility Study and Design Options) for the W80-4 cruise missile warhead LEP. The FY 2016 budget request included \$195 million to accelerate the FPU by two years to FY 2025, a decision made by the Nuclear Weapons Council (NWC) in late 2014. The FY 2015 budget request included \$10 million to start the program. We had initially planned a ramp-up of Phase 6.2 study activities beginning in FY 2016 to support the NWC FPU decision. However, as a result of the FY 2016 continuing resolution, we were unable to begin the planned ramp-up activities until just recently. Furthermore, because of the delay in receiving FY 2016 funding, the program cannot execute the full FY 2016 enacted amount this year. As a result, a significant amount of the program's FY 2016 funding will carry over into FY 2017. Consequently, the FY 2017 budget request is \$25.3 million over the FY 2016 budget request, rather than \$117 million over the FY 2016 budget request, as previously projected. While this delayed start will affect planned technology maturation activities in Phase 6.2A (Design Definition and Cost Study), we still fully expect to meet the planned FPU date in FY 2025 to support the Air Force Long Range Stand Off (LRSO) program.

In FY 2015, the NWC approved additional scope for the W88 Alteration (ALT) 370 to meet an emerging requirement. NNSA is now accelerating the new Conventional High Explosive (CHE) refresh work to match the original ALT schedule. As a result, we are synchronizing the full program to transition seamlessly to the Production Engineering phase in February 2017. In preparation for that phase transition, NNSA will publish a baseline cost report by the end of this fiscal year. This budget request reflects these efforts and includes \$281.1 million in FY 2017 to support the FPU in FY 2020.

Also within DSW, the FY 2017 budget request includes \$1.3 billion for Stockpile Systems and Stockpile Services. These programs sustain the stockpile pursuant to the direction given in the President's Nuclear Weapon Stockpile Plan (NWSP). In doing so, the programs deploy unique skills, equipment, testers, and logistics to enable the daily operations of the nation's nuclear deterrent. Specifically, these programs produce and replace limited life components (LLCs) such as neutron generators and gas transfer systems, conduct maintenance, surveillance, and evaluations to assess weapons reliability, detect and anticipate potential weapons issues such as the recent CHE refresh issue mentioned above, and compile and analyze information during the Annual Assessment process.

The pursuit and application of technological advancements to enhance safety and security while reducing life cycle costs of the stockpile runs through all of these activities. The development of Integrated Surety Architectures enhancing transportation safety and security is an example of these efforts.

Within DSW, the FY 2017 budget request also includes \$577.8 million for the Strategic Materials account to maintain NNSA's ability to produce the nuclear and other materials needed to

support the enduring stockpile. This program includes Uranium Sustainment, Plutonium Sustainment, Tritium Sustainment, Domestic Uranium Enrichment (DUE), lithium and other strategic materials. Funding for Uranium Sustainment will enable enriched uranium operations in Building 9212, a Manhattan Project-era production facility at the Y-12 National Security Complex in Oak Ridge, Tennessee, to end in FY 2025, and allow the bulk of this obsolete building to shut down. The sustainment and modernization of enriched uranium capabilities and the acceleration of Area 5 de-inventory will reduce safety and mission risks in the near term.

Plutonium Sustainment funds replacement and refurbishment of equipment and the critical skills needed to meet the pit production requirements as outlined in the National Defense Authorization Act (NDAA) for Fiscal Year 2015.

Tritium Sustainment ensures the Nation's capability and capacity to provide the tritium necessary to meet national security requirements, either through production at Tennessee Valley Authority nuclear power plants or by recovering and recycling tritium from returned gas transfer systems.

The DUE program continues its efforts to ensure that we have the necessary supplies of enriched uranium for a variety of national security needs.

The FY 2017 budget request also includes \$69 million for Weapons Dismantlement and Disposition, an increase of \$16.9 million, 32.7% above the FY 2016 enacted level, which includes funds to support the President's goal to accelerate the dismantlement rate of previously retired weapons by 20%. This will enable NNSA to dismantle the weapons retired prior to FY 2009 by 2021, rather than the original goal of 2022. It will also result in increased Management and Operating staff at both the Pantex Plant in Amarillo, Texas and the Y-12 National Security Complex.

For Research, Development, Test, and Evaluation (RDT&E), the FY 2017 budget request is \$1.9 billion, an increase of \$36.2 million, 2% above the FY 2016 enacted level. This includes \$663.2 million for the Advanced Simulation and Computing (ASC) Program, an increase of \$31 million for the Advanced Technology Development and Mitigation (ATDM) subprogram that supports high performance computing on the path to exascale, and \$87.1 million for Advanced Manufacturing Development (AMD), a decrease of \$43 million. The decrease reflects a realignment from technology development investments to address higher NNSA priorities. The budget request focuses on continued investment in advanced manufacturing opportunities and improving the manufacturing processes for components that support multiple weapons to maximize the benefits of these investments. Advanced Manufacturing invests in technologies that will reduce the time and cost of current manufacturing methods, replaces obsolete processes, and supports manufacturing developments for future weapon upgrades. Additive Manufacturing, also known as 3-D printing, aids in developing and manufacturing components for stockpile and weapon technology applications. The overall RDT&E request reflects small increases for the Science Program (\$442.0 million, an increase of \$18.9 million) to achieve two

subcritical experiments per year before the end of the FYNRP, and begin alterations to U1a tunnel complex at Nevada to prepare for these experiments: Inertial Confinement Fusion Ignition and High Yield Program (\$523.9 million, an increase of \$11.9 million) and the Engineering Program (\$139.5 million, an increase of \$8.1 million).

The Inertial Confinement Fusion Ignition and High Yield program has spearheaded ongoing improvements in management and operational efficiencies at NNSA's major high energy density (HED) facilities, including the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory (LLNL) in California and the OMEGA facility at the University of Rochester in New York. In FY 2015, NIF markedly improved its shot-rate efficiency with over 350 key experiments performed (compared to 191 in FY 2014) in support of the SSP. This level of effort represents an 85% increase over the previous year and an 18% increase over its goal for 2015.

NNSA has taken major steps in high performance computing to deliver on its missions and play a leading role to support the President's Executive Order on the National Strategic Computing Initiative (NSCI). In 2015, Los Alamos National Laboratory (LANL) and Sandia National Laboratories (SNL) received the first hardware delivery for NNSA's next generation high performance computer, Trinity. This computer will initially have eight times more applications performance than the Cielo machine it is replacing. NNSA also continued its CORAL collaboration with LLNL, the DOE Office of Science national laboratories at Oak Ridge and Argonne, IBM, and other vendors. CORAL will help develop next generation computing platforms to dramatically improve our ability to run increasingly complex codes and will be a significant step on the path to exascale computing.

NNSA collaborates with the DOE Office of Science while making these much needed investments in exascale computing. The FY 2017 budget request includes \$95 million from NNSA for the development of capable exascale systems.

Defense Programs also maintains the vitality of the broader National Security Enterprise. An important aspect of this effort is investing in Laboratory-, Site- and Plant-Directed Research and Development (LDRD/PDRD). Independent reviews have consistently affirmed the importance of the program to the long-term vitality of the labs. LDRD/PDRD provides basic research funding to foster innovation and to attract and retain young scientific and technical talent and is critical to the long-term sustainment of our national laboratories. Congressional support is essential to ensuring that we have both the workforce and the new developments necessary to support the nation's security into the future.

### **Improving Safety, Operations and Infrastructure**

NNSA's ability to achieve its mission is dependent upon safe and reliable infrastructure. The age and condition of NNSA's infrastructure will, if not addressed, put the mission, the safety of our workers, the public, and the environment at risk. More than half of NNSA's facilities are over 40 years old while 30% of them date back to the Manhattan Project era. The FY 2017 budget request for Infrastructure and Operations is \$2.7 billion, an increase of \$442.8 million,

19.4% above the FY 2016 enacted level. This funding will help NNSA modernize and upgrade aging infrastructure and address safety and programmatic risks through strategic investments in both general purpose infrastructure and program-specific capabilities that directly support our nuclear weapons and nonproliferation programs.

To support critical programmatic activities, we are making important strides in recapitalizing our aging infrastructure and capabilities. In FY 2015, NNSA funded new and continuing projects to enhance or replace programmatic capabilities and address the risks posed by the aging infrastructure. NNSA's investment in these projects is vital to the revitalization of the NNSA enterprise. The FY 2017 budget request provides funding for more than 70 recapitalization projects. The request will also support general purpose infrastructure and program-specific capabilities through Line Item Construction projects. These projects include, for example, the Uranium Processing Facility (UPF), the Chemistry and Metallurgy Research Replacement (CMRR) project, the U1a Complex Enhancements Project (UCEP) in support of the Enhanced Capabilities for Subcritical Experiments (ECSE) portfolio, the Albuquerque Complex Project to replace the current inadequate facilities, and a project to expand the electrical distribution system at LLNL.

One of the most worrisome of the NNSA infrastructure challenges is the excess facilities that pose risks to our workers, the environment, and the mission. While many of these facilities will ultimately be transferred to the DOE Office of Environmental Management for disposition, NNSA is focusing on reducing the risk where it can. In FY 2015, NNSA successfully demolished our second non-process contaminated building at Y-12 within the past two calendar years. The FY 2017 budget request supports a number of activities to continue to address excess facilities. These activities include the transition of the Kansas City Bannister Federal Complex to the private sector for environmental remediation and redevelopment, risk reduction activities at Alpha-5 and Beta-4 at Y-12 – both of which are highly process-contaminated – and disposition of more uncontaminated facilities across the NNSA enterprise.

Our Secure Transportation Asset (STA) program provides safe, secure movement of nuclear weapons, special nuclear material, and weapon components to meet projected DOE, DoD, and other customer requirements. The FY 2017 budget request of \$282.7 million includes an increase of \$45.6 million, 19.2% above the FY 2016 enacted levels, to continue asset modernization and workforce capability initiatives. These initiatives include: (1) restoration of federal agent strength levels to meet the goal of 370; (2) the Safeguards Transporter (SGT) Risk Reduction Initiatives to manage the SGT beyond its design life; (3) development and testing of the selected alternative for the SGT replacement, the Mobile Guardian Transporter (MGT); and (4) replacement of vehicles and tractors.

The Office of Defense Nuclear Security (DNS) develops and implements sound security programs to protect Special Nuclear Material (SNM), people, information, and facilities throughout the nuclear security enterprise. The FY 2017 budget request is \$670.1 million, a decrease of \$12.8 million, or 1.9% below the FY 2016 the enacted level of \$682.9 million due to one-time dedicated increases in FY 2016. After adjusting for an FY 2016 one-time \$30 million

designated plus up and \$13 million dedicated line item construction amounts for each year, the remaining FY 2017 operating request of \$657.1 million is an increase of \$17.2 million, or 2.7% above the FY 2016 enacted operating level of \$639.9 million. The request manages risk among important competing demands as NNSA continues to face the challenges associated with an aging physical security infrastructure that must be effectively addressed in the coming years. To this end, DNS is conducting a Site Condition Review (SCR) of the physical security systems at all locations to facilitate the development of an enterprise-wide security systems upgrade and refresh strategy. This effort will identify and manage current and future security improvements and upgrades on a 10-year planning cycle, and includes determining the condition of critical security equipment and infrastructure. A final report of this effort will provide DOE/NNSA leadership and Congressional stakeholders with consolidated and up-to-date information to enable informed decisions for fiscal planning and programming.

The SCR is being conducted within the context of important organizational improvements and management strategies published in the June 2015 Security Roadmap. The document establishes a clear vision and path forward to correcting identified security issues and promoting sustained performance within the NNSA security program. The Security Roadmap is a multi-year effort that implements key recommendations for improvement identified in past assessments; it includes a total of 57 strategic initiatives covering culture, process, infrastructure, and workforce challenges. As of the end of 2015, DNS has completed six of the initiatives and is currently working on another 20 initiatives. The remaining 31 initiatives are pending formal initiation.

For Information Technology and Cybersecurity, the FY 2017 budget request is \$176.6 million, an increase of \$19 million, or 12.1% above FY 2016 enacted levels. This increase will fund much needed improvement to the Information Technology and Cybersecurity program, including Continuous Diagnostic and Mitigation (CDM), Telecommunications Security, infrastructure upgrades for the Enterprise Secure Computing Network (ESN), Public Key Infrastructure (PKI), Energy Sciences Network (ESnet) program, and an increased Information Technology budget. This cybersecurity program continuously monitors enterprise wireless and security technologies (e.g., identity, credential, and access management) to meet a wide range of security challenges. In FY 2017, NNSA plans to continue the recapitalization of the Enterprise Secure Network, modernize the cybersecurity infrastructure, implement the Identity Control and Access Management project at NNSA Headquarters and site elements, and implement all Committee on National Security Systems and PKI capabilities.

### **Defense Nuclear Nonproliferation Appropriation**

The Defense Nuclear Nonproliferation (DNN), FY 2017 budget request is \$1.8 billion, a decrease of \$132.4 million, 6.8% below the FY 2016 enacted levels. This appropriation covers NNSA's nuclear threat reduction mission. DNN addresses the entire nuclear threat spectrum by helping to prevent the acquisition of nuclear weapons or weapon-usable materials, technologies, and expertise, countering efforts to acquire such weapons, materials, and technologies, and responding to nuclear and radiological incidents. The FY 2017 budget request funds two



mission areas under the DNN appropriation: the Defense Nuclear Nonproliferation Program and the Nuclear Counterterrorism and Incident Response (NCTIR) Program.

### **Nonproliferation Efforts**

NNSA made significant progress in nuclear threat reduction in 2015. Working with foreign partners, the Office of Defense Nuclear Nonproliferation removed approximately 170 kilograms of highly enriched uranium (HEU) and plutonium from several civilian sites; successfully down-blended additional HEU to achieve a cumulative total of 150 metric tons of U.S. excess, weapons-usable HEU (approximately 6,000 nuclear weapons worth of material); recovered more than 100,000 curies of disused or orphaned radioactive material; ensured the United States remains on track to fulfill the commitments made at the 2014 Nuclear Security Summit; and supported the Secretary of Energy's efforts to develop the Joint Comprehensive Plan of Action (JCPOA) by providing scientific expertise and technical options to the United States negotiating team.

The Material Management and Minimization (M<sup>3</sup>) program provides an integrated approach to addressing the threat posed by nuclear materials through a full cycle of materials management and minimization. The primary objective of the program is to achieve permanent threat reduction by minimizing and, when possible, eliminating weapons-usable nuclear material around the world. The FY 2017 budget request is \$341.1 million, an increase of \$24.5 million, 7.7% above the FY 2016 enacted levels. This funding increase will accelerate reactor conversions in Kazakhstan and in the United States, as well as initiate the critical decision process to support the dilute and dispose program for domestic plutonium disposition.

The Global Material Security (GMS) program works with partner nations to increase the security of vulnerable nuclear and radiological materials and improve their ability to detect, interdict, and investigate illicit trafficking of these materials. The FY 2017 budget request for this program is \$337.1 million, a decrease of \$89.6 million, 21% below the FY 2016 enacted level. This decrease is possible because GMS is completing its work to protect the remaining International Atomic Energy Agency (IAEA) Category I radiological sources in the United States to meet our 2014 Nuclear Security Summit commitment, and because GMS is committed to reducing its prior year carryover balances.

The Nonproliferation and Arms Control (NPAC) program supports the nonproliferation and arms control regimes by developing and implementing programs to strengthen international nuclear safeguards; control the spread of nuclear and dual-use material, equipment, technology and expertise; verify nuclear reductions and compliance with nonproliferation and arms control treaties and agreements; and address other nonproliferation and arms control challenges. The FY 2017 budget request will fund safeguards and export control activities, including efforts specifically in support of JCPOA implementation. This funding also supports statutorily mandated activities such as technical reviews of export licenses and interdiction cases, technical support for the negotiation and implementation of civil nuclear cooperation agreements (123 Agreements), and upgrades to the 10 CFR 810 authorization process. The FY

2017 budget request for this program is \$124.7 million, a decrease of \$5.5 million, 4.2% below the FY 2016 enacted level. This decrease primarily reflects a return to baseline funding following the one-time increase of \$3.5 million by Congress in the FY 2016 budget for improvements in the export control process, as well as cost-savings in export licensing activities achieved through operational efficiencies.

The DNN Research and Development (DNN R&D) program supports innovative unilateral and multi-lateral technical capabilities to detect, identify, and characterize (1) foreign nuclear weapons programs, (2) illicit diversion of special nuclear materials, and (3) nuclear detonations. To meet national and Departmental nuclear security requirements, DNN R&D leverages the unique facilities and scientific skills of DOE, academia, and industry to perform research, including counterterrorism-related R&D. The FY 2017 budget request for this program is \$393.9 million, a \$25.4 million or 6.1% decrease below FY 2016 enacted levels. The decrease in funding reflects projected savings resulting from a reduction in planned activities for arms control-related R&D and a return to the baseline Nuclear Detonation Detection (NDD) program after development of an initial mitigation path for supply chain interruptions.

Nonproliferation Construction consolidates construction costs for DNN projects. Currently, the MOX Fuel Fabrication Facility (MFFF) is the only project in this program; however, the FY 2017 budget request terminates the MOX project. The Department will complete pre-conceptual design for the dilute and dispose approach to establish Critical Decision-0 (CD-0), Approve Mission Need, and begin conceptual design in late FY 2017. The FY 2017 budget request of \$270 million will be used to bring an orderly and safe closure of the MFFF. The scope and costs will be refined in subsequent budget submissions when the termination plan for the MFFF project is approved.

#### **Nuclear Counterterrorism and Emergency Operations**

DOE has adopted an enterprise-wide approach to strengthen overall preparedness to respond to a broad spectrum of potential emergencies. These emergencies include natural phenomena, such as adverse weather events or earthquakes, and man-made events, such as accidents or acts of terrorism. To better accomplish this mission, in November 2015, NNSA reorganized the Office of Emergency Operations and the Office of Counterterrorism and Counterproliferation.

Both of these organizations are supported under the Nuclear Counterterrorism and Incident Response (NCTIR) Program. In FY 2016, the NCTIR program transitioned to the DNN account in order to align all NNSA funding to prevent, counter, and respond to nuclear proliferation and terrorism. The FY 2017 budget request includes \$271.9 million to support the NCTIR program, an increase of \$37.5 million, 16% above the FY 2016 enacted level. Within NCTIR, NNSA continues to work domestically and around the world to prepare for and improve our ability to respond to radiological or nuclear incidents.

Our counterterrorism and counterproliferation programs are part of broader U.S. Government efforts assessing the threat of nuclear terrorism and to develop technical countermeasures. The scientific knowledge generated under this program ensures that NNSA's technical expertise

on nuclear threat devices, including improvised nuclear devices (INDs), supports and informs broader U.S. Government nuclear security policy and guides nuclear counterterrorism and counterproliferation efforts, including interagency nuclear forensics and DoD contingency planning.

NNSA's emergency response teams must deploy and respond with the most up to date equipment. The current equipment is aging, increasing maintenance expenses, and has started to impact NNSA's ability to perform its emergency response mission. The Radiological Assistance Program (RAP) remains the nation's premier first-response resource to assess a radiological incident and advise decision-makers on necessary steps to minimize hazards, but its effectiveness is beginning to be compromised by obsolete equipment. To ensure that NNSA is able to execute its radiological emergency response mission, RAP's equipment must be recapitalized regularly. Additionally, NNSA is acquiring state-of-the-art, secure, deployable communications systems that are interoperable with our Federal Bureau of Investigation and DoD mission partners, ensuring decision makers receive real-time technical recommendations to mitigate nuclear terrorist threats.

The Office of Emergency Operations is now aligned to focus on its core Department-wide all-hazards and complex-wide emergency management mission. The FY 2017 budget request for this office is \$34.7 million, an increase of \$9.6 million, or 38% above the FY 2016 enacted level. This will improve the emergency management system through an enterprise-wide approach that effectively increases the Department's all-hazards emergency preparedness and response capability during complex, cascading, or enduring incidents, and more effectively calls upon and leverages the assets, resources, and skills across the DOE complex. The Emergency Operations Center (EOC) will continue to be the 24/7/365 single-point-of-contact for Departmental and interagency notifications regarding situations requiring centralized management such as, national emergencies, heightened international tension, Departmental emergencies, natural disasters, or acts of terrorism. The program also manages the Emergency Communications Network, and Continuity Programs for all of DOE, including NNSA. The Office of Emergency Operations will continue to work within the DOE to develop plans to replace the existing EOC and to improve the Department's capabilities to respond to emergencies.

### **Naval Reactors Appropriation**

#### **Advancing Naval Nuclear Propulsion**

NNSA supports the U.S. Navy's ability to protect and defend American interests across the globe. The Naval Reactors Program remains at the forefront of technological developments in naval nuclear propulsion and ensures a commanding edge in warfighting capabilities by advancing new technologies and improvements in naval reactor performance and reliability.

In 2015, Naval Reactors enabled U.S. nuclear powered warships to operate for another year safely and effectively, steaming more than two million miles in support of national security missions. Initial reactor start-up was achieved in the lead reactor plant of pre-commissioning unit (PCU) GERALD R. FORD (CVN 78), the first new design aircraft carrier propulsion plant in 40

years. This historic milestone represents the culmination of almost 20 years of dedicated and sustained effort by Naval Reactors and its field activities, our Department of Energy laboratories, nuclear industrial base suppliers, the Navy design team and the nuclear shipbuilders. This is the first step in fully testing the integrated operations of the propulsion plant, culminating in sea trials this spring. Finally, we continued our reactor plant design and reactor core manufacturing development efforts in support of the new design OHIO-class Replacement reactor plant, including the life-of-ship core.

The Naval Reactors FY 2017 budget request is \$1.42 billion, an increase of \$45 million, 3.2% above the FY 2016 enacted level. In addition to supporting today's operational fleet, the requested funding will enable Naval Reactors to deliver tomorrow's fleet by funding three national priority projects, and recruiting and retaining a highly skilled work force committed to the Navy and the nation. The projects include (1) continuing design of the new reactor plant for the replacement of the OHIO-class SSBN, which will feature a life-of-ship core and electric drive; (2) refueling a Research and Training Reactor in New York to facilitate OHIO-class Replacement reactor development efforts and provide 20 more years of live reactor based training for fleet operators; and (3) building a new spent fuel handling facility in Idaho that will facilitate long term, reliable processing and packaging of spent nuclear fuel from aircraft carriers and submarines.

Naval Reactors has requested funding in FY 2017 to support these projects, and to fund necessary reactor technology development, equipment, construction, maintenance, and modernization of critical infrastructure and facilities. By employing a small but high-performing technical base, the teams at our four Program sites – the Bettis Atomic Power Laboratory in Pittsburgh, the Knolls Atomic Power Laboratory and Kesselring Site in greater Albany, and our spent nuclear fuel facilities in Idaho – we can perform the research and development, analysis, engineering and testing needed to support today's fleet at sea and develop future nuclear-powered warships. Importantly, our labs perform the technical evaluations that enable Naval Reactors to thoroughly assess emergent issues and deliver timely responses that ensure nuclear safety and maximize operational flexibility. This technical base supports more than 15,000 nuclear-trained Navy sailors, who safely maintain and operate the 98 nuclear propulsion plants in the fleet 24 hours per day, 365 days per year around the globe. It will also facilitate delivery, as directed by Congress, of our conceptual plan for potential naval application of low enriched uranium.

#### **NNSA Federal Salaries and Expenses Appropriation**

The NNSA Federal Salaries and Expenses (FSE) FY 2017 budget request is \$412.8 million, an increase of \$49.1 million, 13.5% above the FY 2016 enacted level. The FY 2017 budget request provides funding for 1,715 full-time equivalents (FTE) and support expenses needed to meet mission requirements. We are actively engaged in hiring to that number in a thoughtful and strategic manner. The FY 2017 budget request will support 1,715 FTEs, an increase of 60 FTEs (25 above the authorized 1,690) above the anticipated number of FTEs in FY 2016, and request an additional 25 for a total of 1,740 FTEs in FY 2018 and the outyears. The exact number of

FTEs will be determined following a detailed staffing review. It also provides for a 1.3% cost of living increase and a 5.5% increase for benefit escalation. In addition, the request provides funding for additional Federal Background Investigations for security clearances and provides additional funding to the Department's Working Capital Fund, primarily for Office of Personnel Management (OPM) credit monitoring and the Department's accounting systems (iMANAGE).

In FY 2017, NNSA will continue its efforts to meet current and future workforce needs by analyzing how evolving missions are affecting job requirements. Reshaping of the workforce over the next several years will be essential, including identifying the right staffing size and skill sets and implementing professional development plans now and in the future. NNSA will also continue to streamline its operations, particularly in travel and support services, to provide a lean and efficient organization.

### **Management & Performance**

To enhance our ability to carry out our mission and execute this budget request, we will continue to focus on improving our project management and cost estimating capabilities. In keeping with the Secretary of Energy's increased focus on Management and Performance, NNSA is committed to managing its operations, contracts and costs in an effective and efficient manner. The NNSA's Office of Acquisition and Project Management (APM) is driving continued improvement in contract and project management practices. APM is leading NNSA's effort to institute rigorous analyses of alternatives, provide clear lines of authority and accountability for federal and contractor program and project management, improve cost and schedule performance, and ensure Federal Project Directors and Contracting Officers with the appropriate skill mix and professional certifications are managing NNSA's work. NNSA participates in the Secretary of Energy's Project Management Risk Committee as a means to institutionalize and share best practices across the Department. NNSA established the Office of Project Assessments, reporting directly to the Principal Deputy Administrator, ensuring senior leadership visibility and accountability throughout the Enterprise for project performance. This office generated \$33 million in cost avoidances as a result of their independent project peer reviews.

Since 2011, NNSA has delivered approximately \$1.4 billion in projects, a portion of NNSA's total project portfolio, \$70 million (or 5%) under original budget. Significant examples in the last year include the Uranium Processing Facility (UPF) Site Readiness Subproject, which delivered \$20 million under budget; Y-12's Nuclear Facility Risk Reduction Project, which delivered \$6 million under budget and 11 months ahead of schedule; and LANL's Transuranic Waste Facility Project, which is on track to complete \$3 million under budget. Using the Department's best practices, the UPF and Chemistry and Metallurgy Research Replacement Facility Projects were restructured into smaller more manageable subprojects, significantly reducing project delivery risk.

NNSA is committed to encouraging competition and increasing the universe of qualified contractors, by streamlining its major acquisition processes. The most significant example was

the competitive award of the Kansas City National Security Campus M&O contract, awarded without protest, saving taxpayers \$150 million and increasing the use of small businesses. As an affirmation of the quality of NNSA's acquisition management team, only four out of 103 competitive procurements were protested, with NNSA winning all protests. Finally, NNSA exceeded its small business goal by over 20%, awarding \$233 million to small business in FY 2015.

NNSA will continue to focus on delivering timely, best-value acquisition solutions for all of our programs and projects. NNSA will use a tailored approach to contract structures and incentives that is appropriate for the unique missions and risks at each site. Our M&O contractors are responsible for disparate activities, ranging from research and development to industrial production. Accordingly, we will work to develop the right incentives for each circumstance and for each of our contracts.

### **Cost Estimating and Program Evaluation**

The Office of Cost Estimating and Program Evaluation (CEPE) continues to develop its capabilities to provide trusted independent cost and resource analysis of NNSA's programs and projects. As detailed in its implementation plan, the number of CEPE federal staff will grow from a target of 15 in FY 2016 to 18 in FY 2017. CEPE will conduct independent cost estimates on the B61-12 LEP and W88 Alt 370 in FY 2016 and the W80-4 LEP in FY 2017. CEPE is also institutionalizing best practices for analysis of alternatives and leads the corporate process to build the NNSA budget.

### **Conclusion**

The NNSA performs vital activities at home and throughout the world in support of the nuclear security mission. Its success in addressing 21st century challenges hinges upon the technology, capabilities, and infrastructure entrusted to the organization.

Again, thank you for the opportunity to appear before you today.

Statement of Admiral James F. Caldwell  
Deputy Administrator for Naval Reactors  
National Nuclear Security Administration  
U.S. Department of Energy  
on the  
Fiscal Year 2017 President's Budget Request  
Before the  
House Committee on Appropriations  
Subcommittee on Energy and Water Development

March 1, 2016

A strong Navy is crucial to the security of the United States. Navy warships are deployed around the world every hour of every day to provide a credible “forward presence.” With over 45 percent of the Navy’s major combatants being nuclear powered, including 10 aircraft carriers, 14 ballistic missile submarines, 55 attack submarines, and 4 guided missile submarines – it is vital that these ships are ready when and where our Nation needs them. In addition to supporting these nuclear powered combatants, Naval Reactors has also safely maintained and operated two nuclear powered land-based prototypes – both over 38 years old – to conduct research and development and two Moored Training Ships – both over 51 years old – the oldest operating pressurized water reactors (PWRs) in the world. These land-based prototypes, Moored Training Ships, and Naval Nuclear Power Training Command train over 3000 sailors per year to operate our naval nuclear propulsion plants.

Our ballistic missile submarine force remains on patrol, marking over 60 years of peacekeeping capability through strategic deterrence. The Navy had 34 submarine deployments and 26 strategic deterrent patrols during 2015. In addition, at any given time, there were always at least 56 of 71 submarines deployed or on stand-by to deploy within a few days. Our carriers, USS CARL VINSON (CVN 70) and USS THEODORE ROOSEVELT (CVN 71) completed successful deployments to the Central Command area of responsibility, and the USS RONALD REAGAN (CVN 76) turned over with the USS GEORGE WASHINGTON (CVN 73) to serve as the forward-deployed carrier in Japan.

This past year, we also saw the christening of the attack submarine PCU ILLINOIS (SSN 786) and keel laying for the PCU COLORADO (SSN 788) and PCU INDIANA (SSN 789), our fifteenth and sixteenth VIRGINIA-class submarines. We’ve also added another attack submarine to our force by commissioning USS JOHN WARNER (SSN 785), and began a program that delivers two VIRGINIA-class submarines annually. In 2015, we laid the keel for the second FORD-Class CVN, PCU JOHN F. KENNEDY (CVN 79). We currently have 12 submarines and one next generation aircraft carrier in various phases of construction at our shipyards. Initial reactor start-up was achieved in the lead reactor plant of PCU GERALD R. FORD (CVN 78), the first new design aircraft carrier propulsion plant in 40 years. This historic milestone represents the culmination of almost 20 years of dedicated and sustained effort by Naval Reactors and its field activities, our Department of Energy laboratories, nuclear industrial base suppliers, the Navy design team and the nuclear shipbuilders. This is the first step in fully

testing the integrated operations of the propulsion plant, culminating in sea trials this spring. Finally, we continued our reactor plant design and reactor core manufacturing development efforts to support of the new design OHIO-class Replacement reactor plant, including the life-of-ship core.

The firm support of this subcommittee last year enabled safe operation of the fleet, Naval Reactors mandatory oversight, and continued progress on key projects. Naval Reactors' budget request for Fiscal Year (FY) 2017 will continue this work. The funding request is for \$1.420 billion, an increase of \$45 million (3 percent) over the FY 2016 enacted funding level. In addition to supporting today's operational fleet, the requested funding will enable Naval Reactors to deliver tomorrow's fleet by funding three national priority projects and recruiting and retaining a highly skilled work force committed to the Navy and the nation. The projects are:

- Continuing to design the new reactor plant for the replacement of the OHIO-class ballistic missile submarine, which will feature a life-of-ship core and electric drive;
- Refueling a Research and Training Reactor in New York, to facilitate OHIO-class Replacement reactor development efforts and provide 20 more years of live reactor based training for the fleet operators; and
- Building a new spent fuel handling facility in Idaho that will facilitate long term, reliable processing and packaging of spent nuclear fuel from aircraft carriers and submarines.

Naval Reactors has requested funding in FY 2017 to support these projects, and to fund necessary reactor technology development, equipment, construction, maintenance, and modernization of critical infrastructure and facilities. By employing a small but high-performing technical base, the teams at our four Program sites – the Bettis Atomic Power Laboratory in Pittsburgh, the Knolls Atomic Power Laboratory and Kesselring Site in greater Albany, and our spent nuclear fuel facilities in Idaho – we can perform the research and development, analysis, engineering and testing needed to support today's fleet at sea and develop future nuclear-powered warships. Importantly, our labs perform the technical evaluations that enable Naval Reactors to thoroughly assess emergent issues and deliver timely responses that ensure nuclear safety and maximize operational flexibility. This technical base supports more than 15,000 nuclear-trained Navy sailors, who safely maintain and operate the 97 nuclear propulsion plants in the fleet 24 hours per day, 365 days per year around the globe. It will also facilitate delivery, as directed by Congress, of our conceptual plan for potential naval application of low enriched uranium.

The requested increase in funding is also required to support the planned ramp up of design efforts for the new reactor plant for the OHIO-class SSBN Replacement – the Navy's number one acquisition priority. Providing unparalleled stealth, endurance, and mobility, our ballistic missile submarine force has delivered more than 60 years of continuous at-sea deterrence, and continues to be the most survivable leg of the nuclear triad. OHIO-class Replacement SSBN activity this year includes reactor plant design and component development to support procurement of long lead components starting in FY 2019. Progress in these areas in FY 2017 maintains schedule alignment with the Navy as the program moves forward to construction start in FY 2021 while retiring technical risk and targeting cost reduction.



Related to OHIO-class Replacement and the Program's training needs, the FY 2017 budget request will support the land-based prototype refueling overhaul at the Kesselring Site in upstate New York. In FY 2017, Naval Reactors will continue the core manufacturing work needed for the refueling overhaul, which will also enable timely construction of the life-of-ship core for OHIO-class Replacement. Further, plant service-life engineering design will be completed in FY 2017 to ensure that the land-based prototype overhaul, performed concurrently with refueling, supports 20 additional years of research, development and training.

The Naval Reactors FY 2017 budget request also contains funds to continue the Spent Fuel Handling Recapitalization Project. After many years of funding reductions, Naval Reactors greatly appreciates Congressional support for this much needed project in FY 2016, where we received the full request of \$86M. Congressional support in 2016 enabled progress, design, and planning for site preparations and long lead material procurements in FY 2017. We will use the \$100M requested in FY 2017 to finalize key facility and equipment requirements and advance facility design to support establishing the Performance Baseline in FY 2018 and the start of construction in FY 2019. Continued Congressional support will help ensure that the facility in Idaho is ready to receive spent nuclear fuel from the fleet in FY 2025. Because the new facility's capabilities are required to support aircraft carrier refuelings and defuelings, any delay to the project schedule would require procurement of additional shipping containers to temporarily store naval spent nuclear fuel at a cost of approximately \$150M for each year the project is delayed.

At the requested funding level, Naval Reactors can safely maintain and oversee the nuclear-powered fleet. Naval Reactors can also continue to advance the OHIO-class Replacement and Land-based Prototype Refueling Overhaul, continue progress on the Spent Fuel Handling Recapitalization Project, and meet our environmental responsibilities.

Naval Reactors is committed to executing our projects on time and on budget, and continuing the search for the safest and most cost effective way to support the nuclear fleet. I respectfully urge your support for aligning funding allocations with the FY 2017 budget request.

Mr. SIMPSON. Thank you, Administrator Klotz. Ms. Kaptur.

Ms. KAPTUR. Thank you, Mr. Chairman. General Klotz, I have a question relating to weapons dismantlement. And the budget request includes a significant increase for weapons dismantlement, something you have not typically supported, at least at this level. And I understand that some of this increase is due to Secretary Kerry's announcement to accelerate dismantlement by 20 percent. What benefits does this increase bring to the budget, to the workforce, and are there benefits beyond simply dismantling more weapons?

Mr. KLOTZ. Thank you. That is an extraordinarily good question. We have all along been continuing a dismantlement program to dismantle all those weapons that were retired prior to the year 2009 by the year 2022. Last year, for instance, in fiscal year 2016 the Congress enacted \$52 million to continue dismantlement activities which take place both at the Pantex Plant in Amarillo, Texas and at Y-12 in Oak Ridge, Tennessee.

As you rightly pointed out, Secretary Kerry committed the Administration to seeking a 20 percent increase in the funding that we do for dismantlement, therefore our request for 2017 is roughly \$69 million. So a significant increase.

In addition to allowing us to complete or meet our pledge to dismantle all those weapons that were retired before the year 2009, it will allow us to do that a year earlier. But in addition to doing that, it will allow us to hire more staff at Pantex. We estimate that we will need to hire between 35 to 40 people at Pantex to do this increased workload. We will also need to hire an additional 10 people we estimate, at Y-12 to do this work. So once we have these people on board at both of those sites, they have gotten their security clearances, they understand how to the processes work at both plants, if the need arises elsewhere at Pantex or Y-12 for other work that we do, and we do work for all three of our mission pillars, particularly at Y-12, then those individuals will be ideally suited. So we also see it as a way of starting to build that next generation of workforce, both at Pantex and Y-12.

Did you want to add anything to that?

General DAVIS. No, sir. I will just simply add that these weapons will never be returned to the field in their current condition so dismantling them also gives us some strategic materials that we can use in our other life extension programs. So it also provides that role.

Mr. KLOTZ. Even though a weapon has been retired, we continue to have to ensure the safety and security of those retired weapons. So I used to be in the same uniform as General Davis, and the last thing as a commander you want to do is have things sitting around your base that you do not need anymore.

Ms. KAPTUR. Do you have an estimate of the numbers of those weapons that will be dismantled?

Mr. KLOTZ. We would have to tell you the specific numbers in a different setting. We would be happy to do that.

Ms. KAPTUR. Thank you.

Mr. KLOTZ. Yes, we do have a chart that lays all that out. So we will share that with you.

Ms. KAPTUR. Thank you. And just one other question on domestic uranium enrichment, General. Your fiscal year 2016 budget request included \$100 million to continue operating uranium enrichment centrifuges that were constructed as part of a joint demonstration with the United States Enrichment Corporation, or USEC, now known as CENTRUS. You now do not believe that this effort is worth supporting, so I have three little questions. What changed in the intervening year, when will we require a domestic capability for tritium needs, and thirdly, I understand that given the time horizon you are now considering you may look at technologies beyond ACP to achieve a domestic enrichment capability. How will you make a determination on which technology to use?

Mr. KLOTZ. Thank you for the question. And if I forget to answer one of them, please remind me.

Ms. KAPTUR. First, what changed in the intervening year? You now believe that the effort is not worth supporting.

Mr. KLOTZ. Well, there is a number of things that were done over the past several years. one, in accordance with congressional direction, and also direction within the executive branch interagency, we embarked upon a very serious accounting of the current and future availability of low-enriched uranium, highly enriched uranium, and tritium to meet our defense needs. We also took a look at analysis of the various types of technology there were to produce all three of these commodities.

And then we also took a look at the preliminary cost and schedule estimates of what it would take to build—the Secretary referred to it this morning—as a national security train of centrifuges at Piketon. One of the things that was revealed as we did this inventory of uranium is we were able to find additional uranium that could be used to meet our defense needs, whether it is in the production of tritium or for Naval Reactors or for the weapons program. So the need that we had—

Mr. SIMPSON. Would the Ranking Member yield for just a second?

Ms. KAPTUR. I would be very happy to.

Mr. SIMPSON. When you say you were able to find extra amounts of this material, is this just laying around? Don't we keep track of this?

Mr. KLOTZ. Yes. There are various types of uranium that are in a form which might not be readily usable in the way in which we have traditionally done it. For instance, leftover materials that we are using at Y-12, if you are doing a cost analysis of whether you want to build a whole capability enriched uranium, or invest the money in taking this uranium that might otherwise have been uneconomical to use for these purposes, the cost curves drive you to the point it might be less expensive to develop the capability to use that uranium.

Mr. SIMPSON. So it is not that you found this uranium in the back of the shed—

Mr. KLOTZ. No, sir.

Mr. SIMPSON [continuing]. That you did not know was there?

Mr. KLOTZ. No, sir.

Mr. SIMPSON. Okay.

Mr. KLOTZ. And so there is cost associated with that. And in the out years, we will show those costs of what it takes to develop that uranium and downblend it for the purposes that we need to use it for.

So in any event, given the fact that the need for this uranium—or the need for it to have to use or develop a capability of using only U.S. technology to enrich uranium got pushed out to roughly 2040. So we used the cascade, the 100–120 large centrifuges that were in Piketon, for several years to basically do a proof of concept to do the research and development for these large centrifuges which are there. In our assessment, we have now obtained all the data that we need on how to at this point from the facility at Piketon. There is still work that we will continue to do on the large centrifuges at Oak Ridge in Tennessee and the K1600 facility that is there, another facility located in Oak Ridge. And we feel that will allow us to continue to learn what we need to learn until such time as we need to build out a large national security train to do domestic uranium enrichment with U.S. only technology.

In the meantime, we have also—

Ms. KAPTUR. You are saying it is after 2040?

Mr. KLOTZ. That is when we will have the need for that, so we would have to—and I would have to get you the specific dates when we would have to start thinking about developing that.

And you are right, now that we have the opportunity to do that we also want to consider the possibility of using smaller centrifuges to get to the same objective. And we will do that work at Oak Ridge as well.

Ms. KAPTUR. Thank you, Mr. Chairman.

Mr. SIMPSON. Mr. Fleischmann.

Mr. FLEISCHMANN. Thank you, Mr. Chairman. And I want to thank each and every one of the witnesses for being here today and for your outstanding service to our great Nation.

General Klotz, it is always good to see you, sir. Before I begin my questions I do think congratulations are in order for the entire NNSA team. It was reported I believe last week that the completion of the dismantlement of the retired W69 warhead at Y-12 is complete. Thank you very much. That is the way it is supposed to work.

My first question to you is usually about the same subject, this Uranium Processing Facility. The UPF at Y-12 is obviously very important to me and I think to our country and its national defense. Will you please give an update on the status of the design process and any details that you can give us on the status of the project as we ramp up for construction? And, specifically, what do you plan to accomplish in fiscal year 2017, sir?

Mr. KLOTZ. Thank you very much. And I think the Secretary showed you a chart this morning in the course of the hearing which lays out, I think, in great detail the approach that we are taking for constructing a uranium processing facility, the objective of which is to get us out of Building 9212, which you visited many times, sir, at the Y-12 complex by the year 2025 at a cost cap of \$6.5 billion.

So what we have done, again, at one point we were thinking about building a big box to house everything that was in that facil-

ity and move it in. And as a result of ideas that were conceived in the NNSA and DOE and thoroughly studied by a red team, chaired by Dr. Thom Mason, who is the director of Oak Ridge National Laboratory, we have now come up with what is known as the modular approach, where we are segregating various activities that need to be performed to process uranium by hazard category and by security category, placing them in different buildings. And of course, there is a different cost structure associated with the level of security and the level of safety that you have to achieve.

The first subproject under the redesigned approach was called the Site Readiness subproject. I had the great pleasure of joining you when we cut the ribbon on the completion of that last year. Again, as I said in my opening statement, under budget and on time.

We are now in the midst of work related to the site infrastructure and services subproject, which will continue to prepare us for the actual construction of the UPF facility once we are ready to do that. The project is actually under way, will cost about \$78 million, and we expect to complete that in April of 2018. So a lot of the work in 2017 will be devoted to that.

We are also continuing the process of the design for the three main facilities, two of which are nuclear facilities, the mechanical and electrical building, the salvage and accountability building, and the main process building. So that will also continue over the course of the next several years. And we will also be getting ready to do the next two major subprojects, one called Electrical Substation and also one called Site Preparation and Long Lead Procurement.

Mr. FLEISCHMANN. Thank you, sir. I would like to ask you a question about high-risk facilities. I was pleased to see that NNSA's budget request increased funding for the high-risk excess facilities.

Would you please explain what can be accomplished over the next few years, especially and specifically at Alpha 5, at Y-12, described as the worst of the worst?

Mr. KLOTZ. Well, one of the things that we do have in this budget, Congressman, is we put in some additional funding to ensure the safety and security of Alpha 5 as well as Beta 4, two major facilities at Y-12 which are no longer in use. However, they still exist. Our employees have to go in there from time to time to make sure that they are safe and secure and there are risks associated with them doing that, risks from fire, contamination, water intrusion, and so on. So we had asked for additional money in this particular budget specifically going to carry out a very structured, disciplined approach to making sure that we have done the work that is necessary to sustain those buildings for the long-term.

As I think the Secretary testified this morning, one of his directives that we are carrying out, not only at NNSA, but at the other parts of the DOE, is to arrest the growth of deferred maintenance. One of the things I learned in my time in the military is in an era of constrained budgets, the first dollar will always go to mission and to people. And the dollars that are necessary to sustain infrastructure, to do repairs, whether it is roads or facilities, always gets pushed to the right; it gets deferred. And there is a tendency

to want to take risk in that area. Well, at some point you can only take risk for so long until you get to a tipping point, and literally, at places like Y-12, the ceiling starts to cave in which will shut down operations for extended periods of time.

So with the support of the Congress, last year in the 2016 enacted budget, we were able to basically hold the level of growth in NNSA's deferred maintenance to level. And then there will be a slight downturn in the overall level of deferred maintenance which quite frankly right now is at \$3.7 billion for the NNSA.

Mr. FLEISCHMANN. Thank you. Mr. Chairman, I will yield back to round two.

Mr. SIMPSON. Mr. Frelinghuysen.

Mr. FRELINGHUYSEN. Gentleman and Miss Harrington, we had Secretary Mabus in this morning and Admiral Richardson, CNO, and so I would like to get some sort of updates on your characterization of where we stand, Admiral Caldwell, with the OHIO-class subs. This Committee makes substantial investments, and obviously they are matched on the Department of Defense side. Where are we?

Admiral CALDWELL. Yes, sir. First off, sir, thanks for the question and thanks for the great support that Naval Reactors has enjoyed from this subcommittee. It has enabled us to be successful and it will be important to our future success.

My responsibility for OHIO-Class replacement is the design and the way ahead in the engine room and the reactor plants. The simple answer is we are on a great track. We are on track to support the Navy's goals. And the Navy's goals are to start construction of that national asset in 2021, to complete that construction in 2028, and send that ship to sea in 2031. Now that is a fairly aggressive timeline for construction. We are building a ship that is about two and a half times the size of Virginia, and we are going to do it in seven years, the same time span to build the first VIRGINIA-class submarine.

On the Naval Reactors side, this year and with the support of the subcommittee's past support to us, we are moving forward on the system component and equipment designs, and final designs that will allow us to do heavy equipment procurement in fiscal year 2019.

Two other big portions in this are the development of the electric drive system, which we will get to a full-scale testing at the end of fiscal year 2017. That will be a very important milestone. And then the other big component in OHIO-Class replacement is the life of the ship fuel. That ship will be loaded with fuel once and will last over 40 years without ever refueling. And we are on a great track to do that and start manufacturing the core in about fiscal year 2019. And it will take about five years to develop that core.

So, again, thanks to your success we are on a great path to meet the Navy's timeline and our fiscal year 2017 budget submission allows us to continue that path.

Mr. FRELINGHUYSEN. This Committee under Chairman Simpson, and certainly on the defense side, we are supportive, but there are some pretty extraordinary costs involved here. How do you stay on

top of some of those costs and what is the estimate for the first OHIO-class Replacement sub? It is pretty high.

Admiral CALDWELL. Well, the first will be on the order of about \$9 billion and follow up about \$5 billion. Those figures are being, you know, looked at closely. In regards to the design work that I am responsible for, the total bill is about \$1.7 billion on the DOE side, and that enables me to do all of this design that gets the electric drive to provide the stealth that we need to operate this class out into 2080, and allows us to do the detailed design work to develop this life of the ship core. That is not a trivial undertaking. But we are on an excellent path with periodic program updates to meet. My staff is out providing the regulatory oversight and the management oversight to make sure that these projects are on track. We are very involved. And I think, again, thanks to the support of the Committee, the fiscal year 2017 budget is going to allow us to continue that. So we are exactly where we need to be on the Naval Reactors side.

Mr. FRELINGHUYSEN. A few years ago—and I do not include you in the group—people were rather dismissive of what the Russians are doing and the Chinese are doing, like whatever they had in the way of subs could never match our capabilities. But in reality we find in open sources Russians ginning up their game. They have, you know, some pretty extraordinary capabilities. I assume the Chinese are not slowing down their building of subs, both nuclear and diesel.

Any observations besides, obviously, the Navy's view that you will always have overwhelming superiority? Is there any recognition, especially since we made two VIRGINIA subs every year? We want to continue that. But the end product we are looking at in terms of the replacement, whether that will be a match for the future, for future situations.

Admiral CALDWELL. A couple of thoughts on that, sir. First off, I think what you are seeing in Russia and China is the understanding that a Navy brings value to their national interest, a strong Navy in particular. And they have also seen the advantage of an undersea Navy. You see Russia developing highly capable submarines in smaller numbers, and you have certainly seen China develop larger numbers of submarines. Our responsibility in the Navy is to understand the capabilities that are out there in the world and to make sure that our capabilities are overmatched, or that we overmatch that capability. And I think we are on a great path to do that with the VIRGINIA-class submarines and the ability to modernize those throughout their life. The OHIO-Class replacement design was undertaken with understanding the challenges that she will face over her life, including stealth weapons requirements, the reliability, the endurance, all of those things factored in. And, again, I think we are on a great path to deliver exactly what the Nation needs on schedule.

Mr. FRELINGHUYSEN. Thank you for exuding that confidence. Maybe just put in a plug, I understand that the Washington Carrier group is out there on maneuvers. Is that right? Was that the aircraft carrier we were going to retire? So now it is up and running?

Admiral CALDWELL. It is back on the East Coast, sir, and it will be refueled starting next year. We were able to, due to some great work with support by our DOE labs, and Naval Reactors which enabled a carrier swap that positioned the Ronald Reagan as the forward deployed carrier in Japan.

Mr. FRELINGHUYSEN. We have got to get moving on the forward too. Thank you.

Admiral CALDWELL. And we already are, sir.

Mr. FRELINGHUYSEN. Okay, good. Thank you, Mr. Chairman.

Mr. SIMPSON. I hate to do this, but we have nine minutes to vote. We have started actually trying to constrain it to the time allowed so the first vote doesn't go on for 45 minutes. So we are going to have to leave for just a minute, if you could stay around. I think we have two votes, is that right? We have two votes and will be back right after that. I would encourage Members to come back as soon after that second vote as we can so that we don't have these ladies and gentlemen sitting around all day when they have important work to do. We will be recessed for a few minutes.

[Recess.]

Mr. SIMPSON. We will be back in order.

Representative Roybal-Allard.

Ms. ROYBAL-ALLARD. Deputy Administrator Harrington, last year you spoke to the merits of the Nuclear Smuggling Detection and Deterrence program, which is at the core of our strategy to deter, detect, and interdict illicit international trafficking in special nuclear and other radioactive materials. In the fiscal year 2016 budget hearing you explained that the reason for the roughly 6 percent decrease in a funding cut from fiscal year 2015 was due to the success of the program and the ability for our partners to be self-sustainable and take responsibility of their own operations and maintenance. This year's request is nearly level to the fiscal year 2016 enacted level even as there have been reported cases of radiological material going missing in recent years, including most recently in Iraq.

Are you confident that the current funding levels will reinforce our global nuclear security infrastructure in the face of today's threats? And how does the NNSA help ensure that its self-sustainable partners are preserving the high standard for detecting radioactive materials that the NNSA holds?

Ms. HARRINGTON. Thank you very much for your question. Yes, the Nuclear Smuggling Detection and Deterrence program is key to our counter-nuclear smuggling efforts. We have a high degree of confidence in the capabilities of the program, in part because we continually are reviewing and realigning where necessary.

We have gone through two strategic reviews in the last 4 years. And one of the conclusions from those reviews is that depending on the geographic and other considerations that we have to take into account, diversifying the technologies, not just the fixed detectors, but mobile vans, backpacks, handheld detectors, have to be designed as part of an overall suite of capabilities. Included in that suite of capabilities is our collaboration with both the law enforcement communities in the countries where we work as well as intelligence communities, all of which contribute to a multilayered defense.



You talked about sustainability. That is absolutely key and, if anything, it is the dog and not the tail of this whole effort because it is the ongoing commitment with each of these countries, their ability to work effectively with their neighbors and within their regions that actually builds the global ring of security. So we pay a great deal of attention to that.

And what we never intend to do is simply build a capability and then drop it and walk away. We build networks to sustain professional interaction among these capabilities and to provide continuing education, if you will, training, and updating, both of skills and equipment. We are moving more into doing a variety of tabletop and field exercises to really push the limits even more.

I hope that answers your question.

Ms. ROYBAL-ALLARD. How do you prioritize which countries to work with and what sorts of factors do you look at when considering new partnerships? And what new countries do you expect to partner with in fiscal year 2017?

Ms. HARRINGTON. So the prioritization of countries I can speak about generally, but as you surely appreciate, a number of our considerations would be classified, but we could give you a more detailed briefing on what some of those considerations are. Clearly, the presence of established smuggling routes, the presence of nuclear and radiological materials, the stability of the country or regions in which we see these materials, and other elements are part of a package of considerations that we take into account in our selection process.

Ms. ROYBAL-ALLARD. Okay, thank you.

Administrator Klotz, the Stewardship Science Academic Alliances Program and the site stewardship Minority Serving Institutions Partnerships Program were consolidated into one program in fiscal year 2016. This action was taken to improve the effectiveness of these programs and to encourage additional partnerships among minority-serving institutions.

Can you please provide an update on how this restructuring is doing, how the program is specifically working with Hispanic-serving institutions to get the next generation of Hispanic youth excited about the STEM fields, and if you have seen an increase in the partnerships of minority serving institutions?

Mr. KLOTZ. Thank you very much for that question and let me take the specific response in terms of the numbers for the record, if I could. But just let me underline just how important it is to us in the areas in which we have reached out in all regions of the United States to bring minority serving institutes into our programs for internships, for small activities, but also support to various academic institutions in building curriculum and providing scholarships and work opportunities for people in minority serving institutes.

Just last year, we developed a program for training students from minority serving institutes, largely in the Southeast United States for cybersecurity, which we think is going to be one of the most important fields not only for NNSA and for the Department of Energy, but also for the government and commercial operations in general. Everywhere I go I make a point when I visit our sites

to meet with the people who support those programs and it is something we are absolutely committed to.

Ms. ROYBAL-ALLARD. Do I have time for another question?

Mr. SIMPSON. Yes.

Ms. ROYBAL-ALLARD. NNSA's Radiological Security subprogram works to secure certain radioactive sealed sources located in soft target sites such as hospital or universities. And this work reduces the risk of terrorists acquiring radioactive material that could be used to make a dirty bomb.

The NNSA states that fiscal year 2016 funding will be used to complete security upgrades for 95 domestic buildings containing radiological material. For fiscal year 2017 your budget request includes funding for only 45 buildings. There are 225 additional buildings planned to complete security upgrades between fiscal year 2018 and 2021.

Why does the funding request include only 45 buildings and how do you plan to complete the 225 remaining requests between fiscal year 2018 and 2021?

Ms. HARRINGTON. Thank you. So, radiological security is a high priority for us. The schedule that we have is one that we believe is realistic and what we need to emphasize is that all of these buildings in the United States meet Nuclear Regulatory Commission requirements for licensing these sources in the first place. So this is an augmentation above and beyond those baseline commitments.

Part of the shift in funding is an increase in the amount of funding that we are putting into what we call our alternative technologies program. And this is a pathway to permanent risk reduction because there are alternative technologies available, for example blood irradiators are often found in hospitals and other organizations and could be replaced by x-ray-based technology, so you do not even have to have the source in the facility in the first place. So we are trying to encourage both new technology development as well as greater utilization of existing technologies to eliminate some of these classes of radiological sources altogether.

Ms. ROYBAL-ALLARD. Thank you.

Mr. SIMPSON. Mr. Valadao.

Mr. VALADAO. Thank you, Chairman. Thank you for your time today. I have a couple of questions.

Ms. Harrington, negotiations on the Joint Comprehensive Plan of Action, JCPOA, have concluded and the Department of Energy is expected to play some kind of role in implementing a program. However, your responsibilities for implementation are unclear.

Is there any funding in your budget request to support the nuclear agreement with Iran? I'm asking the wrong person the question, I'm assuming. And, B, what is the role of DOE going forward and why should Congress support these particular DOE activities?

Mr. KLOTZ. Thank you for that question. It is an extraordinarily good question. And I believe, as Secretary Moniz testified this morning, there are a number of ways in which the Department of Energy and NNSA are associated with the Joint Comprehensive Plan of Action.

Probably the most important way in which we are involved is our continuing close relationship with the International Atomic Energy

Agency, which is headquartered in Vienna. As you know, under the JCPOA they have the lion's share of the responsibility for monitoring Iranian compliance with every provision of that agreement. As I said, we have a long association with them. We provide training to their inspectors. In fact, as the Secretary mentioned this morning, every IAEA inspector since 1980 has taken a course in nuclear material measurement at Los Alamos Laboratory in addition to professional continuing education and a whole host of areas.

We also provide technology, electronic seals, tamperproof cameras. There is also a piece of equipment that is being deployed for the first time in Iran as part of the JCPOA called the OLEM, the Online Enrichment Monitor, which you can fit around a pipe and actually measure the enrichment level of uranium gas which is flowing through that pipe to ensure that it is not being enriched beyond the levels that are permitted under the JCPOA.

In terms of specific additions to the budget, for the NNSA budget, in addition to that work which we continue to do anyway in international safeguards, there is an additional 13 million that we are requesting. That will largely go to pay salary and travel for those people who are involved in the redesign of the ARAK reactor, A-R-A-K reactor, to ensure that it meets our nonproliferation goals and cannot be used to produce plutonium, and that we also have some additional work in other areas.

Mr. VALADAO. I am glad you brought up the IAEA. The Government Accountability Office recently released a report that states the International Atomic Energy Agency, the IAEA, the agency responsible for verifying and reporting back to the international community on Iran's compliance, the quote is, "faces an inherent challenge to detecting undeclared nuclear materials and activities."

Do you believe the verification measures that exist will be sufficient for the IAEA to monitor compliance with the agreement? And what will be the greatest challenges, and are there any opportunities to improve the limitations of current nuclear verification techniques?

Mr. KLOTZ. I do believe that the verification measures that have been put in place through the JCPOA are absolutely right for the agreement. And, in fact, to be perfectly honest, when we came out with the agreement, many of us were very surprised and very impressed with the level of verification that was written into that particular agreement. It goes well beyond any other agreement that we have struck with the IAEA has.

As the Secretary mentioned this morning, we essentially will monitor every aspect of the Iranian fuel cycle from the mining and milling of uranium all the way to its disposition in the end. If there is diversion of material to other uses, that is how it will become obvious when you see that in how the fuel cycle flows beyond onsite inspections, beyond all the technological monitoring that we talked about.

Again, as the Secretary said, it is always a challenge to find those areas which are at undeclared facilities in large, open spaces. We also have very capable American and allied intelligence capabilities that will also be paying attention to that.

Mr. VALADAO. And just one more on cybersecurity. Mr. Administrator, as you know, the Department of Energy has experienced a

number of data breaches in the past. The data breach last summer which involved files held by the Office of Personnel Management was a huge failure for the Federal Government. The performance measures in your budget request consistently say the cyber program is effective.

What are you doing to protect employees and obviously, most importantly, our national security information? Do you believe that the measures put in place thus far are sufficient?

Mr. KLOTZ. This is one of the greatest challenges I think the Federal Government faces, whether it is on the executive branch or the legislative branch, and also commercial industry faces, and that is maintaining the security of its cyber networks and its databases. It seems like we always have to work to get one step ahead of what the state of the art is for those who would try and penetrate our systems. We take this very, very seriously, one for the protection of our people and their personal identifying information, to guard against the risk of that being compromised and leading to identity theft, but also we guard some of the most important secrets that the U.S. Government has in the nuclear area. So there is always more that can be done.

Mr. VALADAO. Thank you. Thank you, Chairman.

Mr. KLOTZ. I might add to that, if I could, one of the initiatives that Anne Harrington, I think, has actually spearheaded both for the U.S. Government and the international community is to draw that connection between the physical protection of nuclear facilities, including civil nuclear plants, and protecting their vulnerability to cyberattack. And she has led the charge in getting that onto the international agenda of concerns.

Mr. SIMPSON. Mr. Fortenberry.

Mr. FORTENBERRY. Thank you, Mr. Chairman, good afternoon. I want to return to some of the questioning that I had interacted with and posed to the Secretary this morning regarding just the architecture of our nonproliferation efforts.

You have a slight decrease in the budget. I need to hear some explanation for that please but more than that, is the current construct, the current ecosystem multiagency effort to share information, to think critically, to project out what the emerging threats will be in this regard so that we are all working toward increasing the probability as close to zero as possible of some incident in this regard? Are those efforts ongoing? The Secretary and I, as well as the chairman had spoken about following up to the March report, perhaps with you in another setting to review some of the finer points in that regard but in terms of generalities, is the current ecosystem of nonproliferation, the cross-agency cooperation, our ability to think critically about emerging trends in this regard? Are we doing enough? Are we safe?

To me, everything else that we are doing in the building is inconsequential if we do not get this right, frankly.

Mr. KLOTZ. Thank you and I did watch with rapt attention through the miracle of modern communication technology this morning and of course, we cannot hold a candle to the Secretary in articulating in a clear, concise and compelling way this but let me try. On the issue of interagency coordination and you and I have discussed this before and we certainly need to have additional

discussions. I think at the moment, my personal view is that we have very good interaction at the interagency level between the various agencies which are responsible for nonproliferation.

DOE, State Department, Homeland Security, the Intelligence Committee, the Department of Defense coordinated by the National Security Council which is, by the 1947 law, that is their responsibility to do that.

But I think there is also something that is unique about the current situation. The President made a speech in 2009 in which he clearly stated that securing nuclear materials and dealing with the threat of nuclear proliferation and the threat of nuclear terrorism was a national priority.

That sort of galvanizing guidance, I think, has seized all of us who work in this particular area so we know we should and we can work together on that.

In terms of setting up formal structures, I have often thought that communities of interest in which people are drawn together because they share a common goal, a common objective, or a common need to pool resources is one of the greatest motivators in terms of making people work together. Did you have any—

Ms. HARRINGTON. I would just add very briefly that not only do we have a very vibrant interagency process, and one that I would have to say works. I was recently involved in an issue that in fact involved two separate interagency policy groups and so the White House said: "This is silly, everybody get together in one room. Let's figure out whether we can come to consensus."

We came to the consensus at the Assistant Secretary level which means that we do not have to now bother all the deputies and principals with a decision because we were able to broker that at our level and that really is the point, to get that engine going and real communication on substantive issues, but we also work individually. For example, the Defense Threat Reduction Agency has been a long time partner of ours. Ken Myers will be retiring soon, stepping down as the director of that agency. He was in my office yesterday so that we could, as our last act together, sign an MOU between our two organizations on how they will work together into the future and coordinate specifically.

Mr. FORTENBERRY. Let me ask you this, one of the challenges of holding a congressional seat, of being in public office and yours as well is to take the legacy of what has been done and try to retranslate it in order to meet emerging needs, creativity, entrepreneurship. Have there been gaps identified in the current construct of our nonproliferation efforts, as they exist across basically six agencies or are there duplications that, you referenced one there, that do not make sense that can be informally addressed?

This is what I worry about and again, I look forward into going deeper into the report that you have appropriately issued last year and that may better answer, but to the degree that you can address this, I would appreciate it.

Ms. HARRINGTON. Well I think that one of the issues that we would like to come back, for example, and discuss more is emerging technologies and some of the other things that we believe we have to be prepared to meet flexibly and responsibly in the future.

Mr. FORTENBERRY. Yes, there are enrichment technologies, for instance, that are emerging that would make this quite simpler than the vast infrastructure that is now required and things of this type is exactly what I am talking about.

Ms. HARRINGTON. Correct.

Mr. KLOTZ. Additive manufacturing is another area that both has enormous promise for allowing us to do a lot of our activities less expensively, faster, by cutting down how long it takes to develop a prototype, but by the same token, there is another side of that coin which we can discuss when we get together.

Mr. FORTENBERRY. The Secretary proposed, and I gave this example, that with the advent and the movement towards small modular reactors that this technology is suddenly smaller, scalable, duplicatable more readily. Now he, you know how he is, he is very respectful and polite and he countered the argument by suggesting that that actually takes away the need for advanced enrichment capabilities that could be diverted toward more improper purposes but nonetheless, it is the broader problem of advancing technology without there being any singular controlling entity, I think leaves us vulnerable.

Ms. HARRINGTON. I was actually really happy that you raised that question.

Mr. FORTENBERRY. Oh, good.

Ms. HARRINGTON. Because we have a very close working relationship with the Nuclear Energy Office, which, as you know, has the lead for advancing small modular reactor competitiveness and design in the United States so in 2014, we sat down and looked at these reactors and said: "Well that is great, but why do we not do a study on the implications for safeguards and security of these new designs?" And so we have that study and we would be happy to share it with you and the good news out of the study is that it does not create additional problems compared to existing reactors and in some cases, particularly for the models that are intended for placement underground, subsurface designs, it actually adds to the security so we would be happy to—

Mr. FORTENBERRY. Yes, please.

Ms. HARRINGTON. But we tried to, within the Department, to bring all those streams together and do the thinking as a group.

Mr. FORTENBERRY. One more quick question, Mr. Chairman. In that regard, who drives that narrative? You rightly pointed out the President's projection of policy, his vision and I completely agree.

In fact, I was one of about 15 members who were invited to the White House very early on, we all rode on a bus and we could not figure out what was the binding narrative between us because it was people from all types of philosophical dispositions. We finally figured it out, in fact Senator Markey told me because he was on the bus, that this is everyone who voted against the India Civil Nuclear Trade Deal so there was only a handful of us.

So I want to commend the President for this because this was important work to reestablish this ideal for the international community that at least gathering loose, unsecured material was something that we could all do and then it is a gateway to the broader considerations about nuclear security worldwide.

But in terms of specific emerging technology and who drives the culture of the policy discussion on that? Do you do it? Does the National Security Council do it? Does it happen organically, informally? Is there a hierarchy of process here? I am curious so—should I do it?

Mr. KLOTZ. The answer to all of that is yes, all of the above. It is a community of interest; there truly is a community of interest that involves not just those agencies of which we are a part of that have an abiding interest in these issues.

It involves interested members of Congress and their staff. It involves the Non-Governmental Organizations, the NGOs, some of whom are sitting here who drive the thinking, the thoughts, the ideas forward in ways in which we can make the world a safer place with respect to nuclear proliferation and terrorism.

Mr. FORTENBERRY. And you are satisfied that that collaborative process, without a strict hierarchy, if you will, actually is the right, proper, robust mechanism by which the spectrum of emerging threats or the ability to think constructively and creatively about what we are doing that is leaving us potentially vulnerable, what could be updated, what could be let go of, what could be created is actually occurring, you are confident with this process?

Ms. HARRINGTON. Yes.

Mr. FORTENBERRY. All right, thank you.

Mr. SIMPSON. Before I forget, could you get a copy of that report to all the members of the Committee?

Mr. KLOTZ. This report here?

Mr. SIMPSON. Yes, sir.

Mr. KLOTZ. Yes, sir. I am happy to do that.

Mr. SIMPSON. Thank you. Admiral Caldwell, your budget request reports that the Legacy Spending Fuel Facility will have to operate for another 5 to 12 years after the new facility comes online in order to provide spending fuel examination capabilities. Why were the examination capabilities not included in the design of the new facility? Naval Reactors was working with the Office of Nuclear Energy on a partnership for the new spent fuel examination facility, those plans have not been advanced. What is the status of this effort and could a joint project meet the needs of both programs?

Admiral CALDWELL. I will answer the first part, sir, and then I might come back to just drill in a little bit on the second one so that I am clearly answering your question. The Spent Fuel Handling Project is designed to replace a 55-year-old facility in the extended core facility that is out in Idaho.

That facility is aging, it has some infrastructure challenges there. It could limit our ability to do what the Navy needs in terms of receiving, packaging, and interim storage of spent fuel and additionally, it cannot accommodate the longer fuel that we processed that comes out of the NIMITZ-Class carriers so we are on a steady drumbeat of refueling the NIMITZ-Class carriers so that they can get out to their roughly 50 year lifetime.

So we have been trying to do this for a number of years but due to budget shortfalls, we were never able to undertake it. Now thanks to the support of this subcommittee, we have been able to move out on the plan to recapitalize that expended core facility and

we decided to do that in phases. The phasing was necessary to fit within the budget constraints that we had to deal with.

I think it is important also to understand that there are several aspects of work that go on at the expended core facility today. One is that receipt, handling and packaging of spent naval fuel for interim storage. The other is to take expended cores from reactor plants and go do analysis. That analysis is very important because it allows us to prove and understand whether all of our design considerations play out exactly the way we wanted them to. We learned a lot essentially. We also do examinations of materials that are tested in the advanced test reactor. We have materials that we want to use in future cores. We irradiate them in a flux reactor and we analyze what happens to those and that allows us to build things for the future.

A great example there is the OHIO-Class replacement fuel. All of that research and study is validated by what happens and what we see in those test samples so the bottom line, sir, is that we approach this in a phased approach and the phase most important to us is to be able to process this NIMITZ-Class fuel because we did not want to impact the Navy's ability to operate the fleet.

We had to be able to bring the carriers in, offload the fuel and through a steady drumbeat, bring that fuel out and process it so we are on a path to recapitalize just that one aspect of it first, the spent fuel handling, and now we will go, we will start the construction in 2019 and we will start doing the operations with that longer fuel from the NIMITZ-Class in 2024 and then we are also working on the next phases of this to go recapitalize those expended core analyses and also the work that we need to do in hot cells and the work that we need to do to examine samples that we test in the advanced test reactor.

So that is a fairly complicated set of things that we have to do but the spent fuel handling is only one phase of it and we are on a path to do that.

Now your other question I believe was is there a partnership and I think you mentioned the INL. I just want to make sure that I understand that before I launch off on an answer.

Mr. SIMPSON. You were looking at one time with the Office of Nuclear Energy on a partnership for a new spent fuel examination facility, but those plans seem to have not progressed.

Admiral CALDWELL. Well, what we did, sir, we looked at what other facilities were around which included some of the facilities out at the INL and fundamentally, when we got done with it and doing the analysis of different courses of action, this was the best course of action for us, because there would be too many modifications required to existing facilities.

Mr. SIMPSON. And that goes to the difference in fuel?

Admiral CALDWELL. The difference in fuel, the difference in terms of the amount of things that we have to process. There is a lot that goes into it and the existing facilities just could not do what we needed to do in terms of production capacity and so this is the best course based on the budget that we had and based on the outcome we needed to be able to service the Navy's needs.

Mr. SIMPSON. Okay. Naval Reactors continues to spend approximately \$130 million per year, approximately 30 percent of your in-



frastructure budget on the spent fuel management program. The Idaho Settlement Agreement requires Naval Reactors to transfer all of its spent fuel to dry storage by 2023 and to move all spent fuel out of the State by 2035. Since DOE's overall spent fuel strategy is no longer valid, it has changed substantially over the years and the State seems supportive of Nuclear Reactors continued presence, there may be value in updating the agreement between the State of Idaho and the Navy sooner rather than later. What are your plans or do you have plans to approach the State of Idaho about renegotiation of the settlement agreement.

Admiral CALDWELL. First off, Mr. Chairman, we are in—everything that I can control within my program is tracking to meet our agreement with the State of Idaho.

Mr. SIMPSON. But it is what you cannot control.

Admiral CALDWELL. That's right, sir, the challenge is the National Repository for spent fuel and therein lies the challenge. We have a program now that takes our spent fuel, prepares it and packages it and puts it in interim dry storage which is safe and secure. Also, we are in close discussions, at various times throughout the year, reporting to the governor and the State of Idaho that we are meeting our responsibilities in terms of our agreement. We are going to have to just keep working on that as we go forward. At the same time, I think the Nation needs to deal with how we are going to handle this spent fuel and until we get there, my responsibility is to do that work safely. If you approve my budget request the money that you are giving me in fiscal year 17 will allow me to do what I need to do safely to store that in an interim manner, while we try to figure out how we are going to go in the long run.

Mr. SIMPSON. Well, I appreciate that. To tell you the truth, I think that the people of Idaho are very supportive of what Naval Reactors is doing and I do not hear any complaints, and frankly, that is kind of unusual in my line of work and in yours probably.

Admiral CALDWELL. Sir, no doubt we get great support from the State of Idaho and we are very thankful for that and we aim to keep it that way.

Mr. SIMPSON. Well, you do a good job out there and we appreciate that, but at some point and time, this settlement agreement that was done, I cannot remember how many years ago, 1995—

Admiral CALDWELL. 1995.

Mr. SIMPSON. So it is what now? Twenty years old, 21 years old? Who knows what the future is going to be 20 years from now, you know what I mean? You do the best you can and circumstances change and at some point in time, the State of Idaho, and I suspect all of the States that have had agreements with DOE that are older, are going to have to sit down and say, "Okay, now what do circumstances require that we do and still meet the demands of the State and the needs of the Federal Government and the Navy and others?" And that is always a tough thing to do because the people in Idaho are insisting that we follow the governor's agreement to the letter of the law. They are the ones who took the governor to court trying to overturn that agreement to start with, and now they insist that we follow it to the letter and we are down the road 20 years and circumstances have changed; that is the reality. We know they will change over the next 20 years, but I appreciate the

work that you have done out in Idaho and you do a great job and we look forward to working with you and to complete your mission.

General Davis, the GAO previously found that because NNSA took an extended period of time to prepare a valid cost estimate for the B-61 Life Extension Program, that life extension program now has a little margin in the schedule left to ensure the U.S. commitments to NATO will be met.

The new scope for the W-88 refurbishment was approved by the Nuclear Weapons Council in November 2014 and the Subcommittee still has not been provided the cost estimate. What improvements have been made to the way that you estimate life extension programs? Why has it taken so long to prepare a valid cost estimate for the W 88 and will the extended time it has taken to verify the cost have an impact on the refurbishment schedule? And do you anticipate the W 88 cost to rise significantly above the original cost estimates of \$.4 billion.

General DAVIS. Thanks for that question, Congressman. First, with regard to the B61-12, that program is currently completing its last year of full-scale engineering and development and we are on schedule and on budget to produce our first production unit in March 2020.

This year was a good year for the B61-12. We conducted three drop tests and we also did compatibility testing with the F15, F16, B-2, and F35. In fact, I was able to actually witness the first full-scale integration test of the B61-12 out in Tonapah and it went very well and while I cannot get into specifics, I will tell you that right now we are very happy with where that program is as is the Air Force so that is with the B61-12.

With regard to the W88, essentially through our surveillance program, we identified an issue with the conventional high explosive where it was not aging as we expected to. In order to make sure that that weapon continued to meet its military requirements, we made the decision, working through the Nuclear Weapons Council that we need to replace that conventional high explosive. Obviously that was something that just happened in the last about a year. Going through our discipline process, we will come up with a new cost estimate, our first cost estimate for that program in September of this year and then we will match up the existing Alt 370 Program, which was working to put a new arming, fusing, and firing capability into that weapon along with the conventional high explosive refresh and we will match up those programs in March of 2017 in Phase 6.4 which is our production engineering.

Mr. SIMPSON. In order to make sure that a more affordable design that meets military requirements was not overlooked, the fiscal year 2016 Committee directed the NNSA to conduct an independent validation of the alternatives. The NNSA selected for the long-range standoff warhead which is in the early stages of development. When do you expect the results of that independent validation to be available? How many alternatives did you consider? And were there any that were less expensive than the preferred alternative you are now developing? And do you believe that the process the NNSA uses to analyze refurbishment alternatives is mature and comprehensive?

General DAVIS. Sir, with regard to the legislation, it actually asked us to have a JASON-like organization take a look at that. We approached the JASONs, they did not feel like this work was in their wheelhouse so they directed us to some other folks. We are currently in conversations with the MITRE Corporation to perform that analysis for us. We expect that to being hopefully later this summer.

In terms of the program, I think we, over the last several years, have put a lot of discipline into it. When NNSA first stood up, the real issue that they had was to figure out how to do this stockpile stewardship program. How do we do the hard science to make sure that the stockpile is working as it is supposed to without having to run testing.

Our first life extension program was the W76 which is now just over 60 percent complete so we are now taking that same rigor that we put into the science part of NNSA and we are putting it to the program management part.

To that end, we recently hired, although we have not announced the candidate yet, a program executive officer that will oversee all of our life extension programs to continue to bring rigor to that process.

Mr. SIMPSON. Thank you, and thanks for the work that you do in all of this. I know it is very complicated and important work.

Ann, your budget request and there are many people on the floor who will look at a budget and that is the determination of your commitment to a particular subject matter. Your budget request is down, how much was it, \$132 million from last year. That means \$132 million less commitment to nonproliferation, according to some people.

Mr. SIMPSON. Tell me why it is down, why the request is down, and what the implications of that are in terms of nonproliferation so that we can answer those questions on the floor.

Ms. HARRINGTON. Okay, thank you. The fact that we have dropped a few percentage points in the amount of money in the budget does not reflect at all any less commitment to nonproliferation by the Secretary, by the Administrator, by me, or anybody else in the organization. But, as you know, we have proposed a different path forward for the Mixed Oxide Fuel Fabrication Facility in South Carolina, a dilute disposed option.

Mr. SIMPSON. I think I may have heard something about that this morning.

Ms. HARRINGTON. I would be surprised if you did not, but that is a difference of \$70 million right there. And then trying to be good custodians of our budget, we have some prior year funds, which we have not been able to spend out as quickly as we had hoped. In our line of business, a lot depends on your foreign partners and their ability to absorb money at the pace that we hoped that they can.

The funds that are in the budget will fully fund the activities that we believe we can deliver in 2017, and we have restored in the out-years the funding for the program that is implementing slower than we had hoped because we fully intend to be able to fulfill those commitments. So I think, on balance, we have a good

pathway forward. We are not worried about being able to execute during 2017 with the funds that we have requested.

Mr. KLOTZ. Could I just add a little bit to that?

Mr. SIMPSON. Sure.

Mr. KLOTZ. Everything Anne said is absolutely right. The good news for us last year was that Congress voted an appropriations bill for fiscal year 2016, and, of course, we are your biggest cheerleaders to get an early appropriations bill this year.

Mr. SIMPSON. We are going to try.

Mr. KLOTZ. You have no stronger supporters, Chairman, than for that. But there still were budget caps we had to write to build the fiscal year 2017 budget. We have a big portfolio that covers a lot of different interests and with strong stakeholders behind it. No one is more passionately committed to the nonproliferation activities that we do than myself, than Anne, than the Secretary, but we had to make a hard-headed business decision. We had to be able to cash-flow everything at fiscal year 2017. When we looked across the portfolio, we saw we had these uncostered balances, as the Secretary and Anne have mentioned already, and it just made business sense to us to use the money that was in the bank to fund these projects in 2017 until we can tackle the fiscal year 2018 and beyond as we build the next budget.

Mr. SIMPSON. Well, I appreciate that and I appreciate the important work that you do. And probably nobody appreciates it more than Congressman Fortenberry, who has worked on this very dedicatedly, and not just from the perspective of looking at the exact budget that we have each year to look at, but in the long-range overall view of how we address this issue and are we looking at it in the right way. I am glad that there is somebody on the Committee that takes a real interest in looking at that, so I appreciate that, Congressman.

And Congresswoman Kaptur.

Ms. KAPTUR. Thank you, Mr. Chairman. General Davis, what is Defense Programs doing in the area of additive manufacturing?

General DAVIS. Well, ma'am, additive manufacturing is a great opportunity for Defense Programs in terms of future technologies, especially in terms of fabricating pieces and parts at our Kansas City National Security Campus. In the past, we would have to send stuff out to be manufactured. It would take several months to turn around. With additive manufacturing at that location, we can now change the forms in a matter of weeks, so it is a great opportunity for us to reduce costs. I can tell you, out at Lawrence Livermore, they are also doing some groundbreaking work in additive manufacturing in terms of how we can use it within the actual design of actual components that would go within the nuclear weapons as opposed to the nonnuclear components as well.

Ms. KAPTUR. All right, so those would give you locations?

General DAVIS. Well, I would say throughout the NNSA enterprise, additive manufacturing is being used and, certainly, we are pairing all of those labs and plants together to leverage what they are learning at the different locations to get the maximum effect.

Ms. KAPTUR. Theoretically, in the future, could additive manufacturing actually serve to compromise security in any way?

General DAVIS. Well, certainly one of the challenges with additive manufacturing is that, right now, it takes a lot of skill and expertise to build certain components within the weapons that we use. Once you get additive manufacturing, really the secret sauce is in the design, and those designs are held on computers, so certainly cybersecurity is an important element to protecting those in the future, so there is certainly some hard science that still goes into the work. Certainly protecting the cyber elements of the design is important, and then also there is some unique technologies that NNSA is developing in this area.

Ms. KAPTUR. Yes, please, Ms. Harrington.

Ms. HARRINGTON. So it might not surprise you that General Davis' group and my group are working together on this issue, looking at how to maximize the utilization of this important emerging technology but still protect it, develop classification guidance so that we know within the complex how we can responsibly use it. So we are, again, very focused on those issues and have a great team working together to come up with a solution.

Ms. KAPTUR. Without getting into too much detail, I would assume the areas of technology that you are particularly interested in, you prefer not to say.

Ms. HARRINGTON. We could come back and talk about that.

Ms. KAPTUR. Okay. All right, thank you.

Admiral Caldwell, could you give us an update on the study of the feasibility of using low-enriched uranium in naval reactors that was required in the fiscal year 2016 Defense Authorization bill and funded at a level of \$5 million in the appropriations bill?

Admiral CALDWELL. Yes, ma'am. We completed an initial report over a year ago that just laid out the high-level concerns or things that we would have to deal with in a low-enriched uranium type program, and as directed in the NDAA for 2016, we have a draft, conceptual study to answer Congress' question about this particular issue. That report is in routing for approval, and I can give you some sense of where we are on that.

I think the first thing I would tell you is that from a strictly military standpoint, the application of low-enriched uranium is problematic because, fundamentally, what you are doing is you are removing the amount of available energy that you are putting into the core. Now, we have decades of experience in using highly enriched uranium that allow us to operate these reactors for longer and longer time periods. Again, a great example is the OHIO-Class replacement core, which will last over 40 years.

Now, from the U.S. perspective, though, a low-enriched uranium core, or pursuit of such things, offers us the chance to take a leadership role. It also offers, within the Naval Reactors Program, a chance to balance out the demand signal on our technical community because, as we come through the OHIO-Class replacement design, we are going to taper off in the demand signal. So to sustain that workforce, pursuing an advanced fuel system, which would be required for a low-enriched uranium, would keep that team working, which is important to us as we get to the next generation submarine.

Now, the conceptual study, we looked at what it would take to develop the low-enriched uranium core and what it would take to

deploy. The development we estimate would take about 10 to 15 years. It would take an advanced fuel system because you are trying to figure out how to load more fuel because it has less energy. And it would take, again, 10 to 15 years and it would be on the order of about \$1 billion. Any work that we put towards that would be of value to the Naval Reactors Program because, again, advanced fuel-cell systems, we could leverage that and even use highly enriched uranium.

The conceptual plan has several off-ramps. I talked before about irradiated samples that allow us to examine materials. The plan lays out several phases of irradiated materials that we would take and look at, and over those 10 to 15 years, it would allow us to take some off-ramps to decide whether it was appropriate to pursue the low-enriched uranium core.

The conceptual study examines going after a potential use in a carrier core. That is a bigger core than a submarine, and it is not practical today to go do that in a submarine core. So, again, success could not be assured in this effort; 10 to 15 years just to develop the fuel system and probably another 10 years or so to actually deploy the fuel system, that means to construct it and deploy it in a ship.

So we are several generations away, but the conceptual plan lays out this opportunity. And if that is the path that we end up going down, it would take money above what we currently have in our budget because we could not do it at the expense of the work that we are doing today to support today's fleet and the OHIO-Class replacement and so forth.

So the plan lays out a conceptual plan starting in fiscal year 2018, I hope that answers your question, ma'am.

Ms. KAPTUR. Yes, thank you very much.

All right, General Klotz, could you tell me, does NNSA need to produce any pits to support the current and planned life extension programs?

Mr. KLOTZ. Current, no; future, yes, and so that is the path that we are on. The major demand signal for being able to manufacture pits will be when we get into what we call the Interoperable Warhead 1, which will most likely start off addressing the Air Force's need to do a life extension program for the current W78 warhead. In the meantime, however, we do not have a capability to produce pits and in great number, so we are in the process of doing some significant work at Los Alamos National Laboratory in repurposing existing facility space in a building called PF-4 and another building called Irradiation Laboratory. This year, we will begin analysis of alternatives, on what is known as the modular approach to building additional capacity at Los Alamos to begin to develop pits on the schedule, which the Congress has directed us to do in subsequent National Defense Authorization acts.

Ms. KAPTUR. Thank you, and I had one follow-up to—

Mr. KLOTZ. Yes, ma'am.

Ms. KAPTUR [continuing]. An earlier issue, and that is dismantlements. In addition of your earlier points, is not work leveling at Pantex also a benefit to increasing the rate of dismantlements?

Mr. KLOTZ. Well, with additional people, of course, obviously, that gives you the opportunity to level the work between the dismantlement and the life extension work that has to go on because the skill sets, in many respects, are the same, so with the additional 30 to 40 to 45 people at Pantex and the additional people at Y-12, that gives you a great deal more flexibility.

General DAVIS. I would say, normally, we do use dismantlements to work to balance a workload at Pantex. In this case, the folks we bring on to accelerate those will be dedicated to that effort until that is complete.

Ms. KAPTUR. I have a final question of each of you. In general terms, is there any unmet scientific horizon or necessary workforce capability that you consider primary to conducting your responsibilities more ably? So science and workforce development.

Mr. KLOTZ. Well, I will go ahead and start. The biggest challenge that we are facing at the moment, of course, is the graying—and I can say that, at my age—of our workforce, both on the Federal side, but, more importantly, in our laboratories and our production facilities. In many places we have a high number of people who are now eligible to retire. Many of them will not because they love what they are doing or they have got personal financial reasons why they want to continue to work, but they are certainly eligible to do that. So we need to make sure, both, again, on the Federal side and the laboratory side, that we are doing all the things that we need to do to recruit the next generation of leadership in this particular endeavor. So that is one of our greatest challenges by the way, in fields, STEM fields, which there is very high demand in the commercial sector for right now, so I would say that is one of the key things that we need to address.

Ms. KAPTUR. Thank you.

Ms. HARRINGTON. So I would add to that that some of the challenges that we face now, many of the challenges, for example, that we have seen in Iran, have monitoring a really unique arrangement to limit their nuclear activities to peaceful ones only, has made us really, I think, through what are all of the things within the nuclear fuel cycle that we need to be more aware of, how would we have more comprehensive monitoring, especially as countries continue to move forward with their nuclear power programs.

So that is an area that really is of concern and, very clearly, how would we possibly detect any terrorist acquisition or intent to utilize nuclear radiological materials and, again, getting down to smaller quantities, more difficult movements to detect. So those are the sorts of things.

But, again, reinforcing what the administrator said, being able to link some of these activities to universities, being able to draw talented young students into these programs, for example, through our university consortia, has provided both a unique pathway for us to get new talent, but it also helps universities identify areas of research that are really relevant to our mission. So we will continue to pursue those programs, but I have no doubt we will see new challenges in the future and we will have to go back to our labs and test their capabilities on a regular basis.

Ms. KAPTUR. Thank you. General?

General DAVIS. Yes, so for Defense Programs, I would say it is probably exascale computing. There was a time, certainly, when NNSA drove advanced supercomputing and, basically, industry provided us everything we need. Now we are not the primary user for advanced supercomputing and exascales. So, as we go to exascales, it is important that we are involved, so we can make sure that our codes continue to run. Obviously, our modeling simulation is key to continuing to certify the stockpile and making sure that we understand exactly what is going on with those weapons to keep them safe, secure, and reliable.

Ms. KAPTUR. Thank you. Admiral?

Admiral CALDWELL. Ma'am, I would say that the singularly most important thing to enable the success of Naval Reactors' programs is our technical base. This is the funding that goes towards our Naval Reactors' operations and infrastructure to our Naval Reactors' development and to our program direction. That money really goes to support what I call the flywheel, the linchpin, the center of gravity for everything that we do. It supports the infrastructure of the labs and facilities. It pays for the salaries, for my folks to do the oversight and meet our regulatory responsibilities. It pays for the scientists, the engineers, and technicians that do everything that we do in the program from research, design, construction, operation, fleet support, and dealing with disposal at end of life of the core.

That technical base, in fiscal year 2017 budget, the request is for \$949 million. I could not do what I need to do to support today's fleet, tomorrow's fleet, to recapitalize the tools, the infrastructure, the equipment that I need to be able to ensure the safe, reliable operation of reactor plants. I will not go into it now, but there is a litany of things that that technical base has enabled, all the research and development that eventually goes into reactor plant design. The electric drive on OHIO-class replacement is a product of all that technical base work over the last several decades. The OHIO-class replacement life of the ship fuel is also a result of decades of work in that technical base. Every day that technical base responds to requests from the fleet on the order of 4,000 requests per year for technical assistance that keeps our fleet operating. So your support to fund that technical base is absolutely essential to what I do.

Ms. KAPTUR. Thank you. Thank you very much for your testimony today. Mr. Chairman?

Mr. SIMPSON. Thank you.

Mr. FLEISCHMANN [presiding]. Thank you. Mr. Klotz, I have a question about security, sir. This committee has long been concerned and acted on those concerns about security funding at NNSA sites for several years.

There has been an increased workload placed on life extension programs at NNSA's production facilities in next year's budget. Is there a corresponding need to increase the security budget or the security budget to accommodate those increases, and how will that be accomplished, sir?

Mr. KLOTZ. Thank you very much for that question, and of course, safe, secure, and effective security ranks up there in the



very top of what we have to do in order to protect these assets, as well as the people who work around them.

One of the things, since we came into the position a couple of years ago, that we have stressed is first of all making sure we had the right people in the right positions throughout our security apparatus.

We had a lot of vacancies. We had a lot of people who were in acting positions, and we have placed great stress on getting highly qualified people into key positions both at headquarters here in Washington, DC as well as at our site offices, and also making the same stress on the M&O partners that we work with.

The other thing we called for was development of a security roadmap. This was another idea that came out of the Congress, and that has been produced. If you do not have a copy of that, also in addition to making copies of that document available, I would be very delighted to make that available as well.

We are also again at the direction of the Congress taking a look at sort of a 10-year plan for how we refresh all of our sites. A lot of the perimeter intrusion detection alarm systems, the PIDAS, such as the one we have at Y-12, are beginning to age out in terms of sensors, the cameras, other aspects of that.

So, we are working with the CSTART—please do not ask me what that acronym stands for. It is an operation that we have that Sandia National Laboratories spearheads for all of our sites in cooperation with DOD. Again, another product of congressional direction, which is yielding a lot of benefits in terms of how we go forward in terms of that security.

At the end of the day though, it boils down to making sure we have, you know, the people, and the good people to do that work, and so we have asked for some additional money in that area to help build up our capabilities.

Mr. FLEISCHMANN. Very good, sir. Thank you. I have a question about lithium, and whomever would like to answer that. The Government Accounting Office and the Department of Energy's own Inspector General's reviews highlighted a shortage of lithium for use in refurbishing nuclear weapons, saying the demand had risen and could lead to a lithium shortage at Y-12 by 2018.

Could you discuss your plans to respond on how it will affect life extension programs, and does the budget request indicate a 2-year delay in replacing the lithium facility?

General DAVIS. Congressman Fleischmann, thanks for that question. As you know, lithium is an important material used in U.S. nuclear weapons. The GAO did do a report and said that the existing supply of lithium would be used up in 2018. The key word there really is the "existing" supply.

NNSA does have a plan to create enough useable lithium to get out to 2028 by doing two things. First of all, we will convert lithium from dismantled weapons, and we also have an existing feedstock of lithium that will convert into the proper type of lithium for the life extension programs.

Of course, we will need to sustain the current lithium production capability at Y-12 until a replacement facility does come on line. To that end, we started an analysis of alternatives using the NNSA's process last month. We expect that to be done by the end

of this fiscal year. That will examine essentially all the options that are available, everything from recapitalizing the current capabilities at Y-12 to perhaps looking at the potential for commercial providers to provide this capability.

So, we plan to have that capability on line no later than 2025, giving us 3 years of cushion in between the time that capability comes on line and we expect to run out of the existing supply of lithium.

Mr. FLEISCHMANN. Thank you, sir. I would like to talk about Y-12's alarm response training. Ms. Harrington, before I ask you that question, I want to thank you. You came to Oak Ridge and actually spoke at our ETEC meeting, were very warmly received, and I really appreciate your coming in there.

That is a group that meets every Friday at Oak Ridge, and it is DOE, business people. It is just a great group of contractors, and many of you have been there. We get a lot done in that forum, and thank you for attending.

Y-12 has been called the "Fort Knox of highly enriched uranium." How are you using Y-12's expertise in securing our Nation's highly enriched uranium to secure sensitive nuclear or radiological sites around the globe?

How do you see an increased role for Y-12's alarm response training that trains personnel responding to civilian nuclear and radiological security alarms?

Ms. HARRINGTON. Thank you, Congressman. It was truly my pleasure to come down and spend time with ETEC. It is a remarkably energetic and terrific group. There is just such a sense of community there, you should be very proud.

Mr. FLEISCHMANN. Thank you.

Ms. HARRINGTON. So, our alarm response training program, I think, is a terrific example, number one, of utilization of excessed buildings. I think we are now in our second excessed building. The first one, we outgrew. It was the old clinic at Y-12, and we identified it as being suitable for the type of training that we do there.

Our new facility, and I was there for the ribbon cutting on that one, is even better because it provides us a more diverse set of scenario's within the building, as well as a very nice training area with monitors where you can see the simulated attacks and response, how a response force would actually have to respond.

So, it is as close to real life as you can get with blue and red plastic guns, but it is a really effective way to train emergency responders, local police forces, university police forces on how to respond and keep their communities safe.

So, it has been a terrific opportunity, and we have trained thousands of people from across the United States already.

We are also using it to bring our international participants not only to have them go through the training, but to help them see how they can set up similar training facilities themselves, particularly in areas where there is higher risk for this kind of intrusion.

So, it has been a terrific test bed for us. It has really paid off to communities all across the United States. We are in the process, as I said, of expanding both how we use it for international guests, but particularly as a model for how to do this well.

Mr. FLEISCHMANN. Thank you. General Davis, I have a final question for you, sir, on the Supply Chain Management Center. Members of the small business community have discussed with me rather at length the challenges with NNSA's Supply Chain Management Center, and more specifically, the enterprise-wide procurement agreements.

I have been told that NNSA is aware of these concerns. Are there plans to address these issues to give small businesses a more level playing field to compete on procurements, sir?

Mr. KLOTZ. Can I take that?

Mr. FLEISCHMANN. Yes, sir.

Mr. KLOTZ. Just 2 weeks ago, I joined all the members of the New Mexico congressional delegation for a first ever industry day that the Supply Chain Management Center has held in New Mexico or anywhere else for that matter, in order to address the concerns of small businesses.

Four hundred people signed up, 300 people showed up. They heard from the congressional delegations. They heard from the manager of the Supply Chain Management Center.

What the Supply Chain Management Center is—it is located in Kansas City at our operation there, but it is a strategic sourcing center which basically serves as a facilitator for companies all over the United States to become a supplier of commodities to not just NNSA's eight sites, but many Environmental Management, EM sites, as well.

The purpose of the get-together there was to address the very concerns which small businesses in the State of New Mexico, particularly northern New Mexico, have expressed about the Supply Chain Management Center, to tell them how it actually works.

We do not direct—NNSA and the Department of Energy do not direct people to use the Supply Chain Management Center. We created it as an opportunity for our M&O partners to reduce costs by buying strategically.

But it is also a great opportunity for small businesses in New Mexico, but elsewhere too in fact, to do business with DOE and with NNSA, and in some cases, to actually expand beyond the local regional areas in which they may do business now to nationwide.

So, we gave them an opportunity to learn how the Supply Chain Management Center works. We gave them an opportunity to talk face-to-face with the commodity managers from Kansas City and also the procurement officers from each of our sites, which are part of the M&O contractors, and we are in the process of collecting data which we will share with the New Mexico delegation as well as you, sir, and this committee as to how many people responded and what the feedback was to that.

We have also changed a little bit of our processes and procedures. We set this thing up 10 years ago. As a former boss of mine used to say, when you are talking about fallible human beings working in complex organizations, there is 100 percent chance we do not get 100 percent right 100 percent of the time.

So, we know there are some adjustments. We have put in a provision whereby instead of being a national supplier, you can be a regional supplier. In fact, we have had one New Mexico company that has very successfully taken advantage of that change.

Mr. FLEISCHMANN. Thank you, sir. Appreciate that, and appreciate your endeavors in that regard. My final comment would be to Admiral Caldwell. I want to thank you for taking the time to come to my office to meet with me to go over naval reactors in detail. I knew your predecessor. He did a great job as well.

I just wanted to convey from the Oak Ridge community how much we and I cherish the relationship with the Navy, and all that you do for our country, and we hope we will be able to continue on into the future to provide the much needed fuel as the Navy goes forward, sir.

Admiral CALDWELL. Thank you, sir. We value that relationship. As I think I told you in your office, I endeavor to enhance and strengthen that relationship going forward.

Mr. FLEISCHMANN. Thank you, sir. With that, Congressman Fortenberry, do you have any questions?

Mr. FORTENBERRY. Yes, briefly, Mr. Chairman. Thank you. As Chairman Simpson had alluded to earlier and you all gave a good forthright answer about your commitment to nonproliferation, but as it is showing up in budgetary matters, it is sending a signal that you are going to need to explain what you very well did.

One of the complaints about government is agencies spin down monies they have in order to build upon baseline for more expenditures in the previous year—in the next year, rather.

So, in this regard, you are to be very much commended for again being frank that there was an absorption capacity problem with other partners. You had some leftover funds. You were living under caps, that is a reality, so you are effectively turning money back to the government, or directing it anyway.

That creates the problem for next year. You better hope all of us are still here when you come back and show an added expenditure above a new baseline. I think we ought to make an asterisk and note for the record in that regard.

Two other quick issues. One is you mentioned the graying workforce problem, graying personnel problem that you are having. I have raised this with the Nuclear Threat Initiative as well, the idea of the next generation of academic experts, of scientists, nonproliferation persons who willingly cast themselves into the strategic thinking of nonproliferation, military and nonmilitary.

Where are we in this regard? Are we treading water? I do not see much enthusiasm frankly for this field among the next generation, and that worries me.

The second question is regarding the International Atomic Energy Agency. I raised some of this earlier with the Secretary. I think they grow in relevance, they grow in prominence as again whatever architecture we are going to have for the next 100 years to assure that civilization is not under grave threats from nuclear annihilation. That entity grows in its potential impact to keep us safe.

Are you comfortable with, again, our shaping of that institution's culture? We have, I think, an excellent director general. That continuity of process is essential, and that is harder to control in international environments.

So, those two questions, please.

Mr. KLOTZ. Let me start, and Anne has some thoughts on this as well. You are right. There was a period of time where strategic studies, nuclear studies, defense studies in general—there were more opportunities in various academic institutions across the United States, including the ones when I attended, and that sort of fell off with the end of the Cold War.

I think there has been sort of a resurgence of interest, a lot of it fueled not so much by the nuclear strategic force side of things, but the nonproliferation, the nuclear security field.

We have had a number of programs in which we have tried to draw upon that expertise, one of them is the NNSA graduate fellows program, where we bring in some of the best and brightest out of recent graduate programs and undergraduate programs to work with us at NNSA for a year, and then hopefully stay or go on to the laboratories.

We have had a very, very good success rate in terms of—

Mr. FORTENBERRY. Are there Centers of Excellence in this regard across the country that you primarily turn to or is it coming from multiple disciplines?

Ms. HARRINGTON. Well, there is a group of targets, universities, for example—I hate to keep picking on you, sir, but the University of Tennessee.

Mr. FLEISCHMANN. Bless you for that.

Ms. HARRINGTON. Howard Hall runs a super program there, but he is not the only one to have recognized that we need first-rate university based programs that not only look at the technical issues but blend those with the international relations and policy issues.

We would love to bring some of our fellows to meet you.

Mr. FORTENBERRY. You could place one in my office if you like. We have more than we can handle.

Ms. HARRINGTON. We cannot say that too loudly around our folks because they are eager and they are talented, and they are extremely bright. Some of them actually end up going to the IAEA as junior professional officers.

We have a lot of young talent that feeds into the IAEA like that. They will go over, they will spend a couple of years in a junior position doing regular staff work, learning an enormous amount, but carrying with them all of the things they have learned working with us.

Mr. FORTENBERRY. So, segue that into my question about the IAEA.

Mr. KLOTZ. It is a very important question, and I think with the JCPOA and as we move into the post-Nuclear Security Summit world with the Nuclear Security Summit that President Obama will host at the end of March, beginning of April of this year, the IAEA and other international organizations will likely have an even larger role and more important role to play in that process.

The United States has been intimately involved with the IAEA since its creation in the 1950s. I think we know the organization very, very well. As I said earlier, we provide training. We provide technology. We help them develop their concepts.

Now, it is not just a U.S.-driven thing. We have some great international partners who also believe this is an important organiza-

tion and also commit resources and talent to the effective operation of the IAEA.

We also have a lot of Americans over there serving, as Anne suggested, in a variety of leadership positions as well as early career positions in the IAEA.

As the Secretary said this morning, it is something we are going to have to pay attention to as one of the member nations of the IAEA to make sure they have the funding they need, either through voluntary contributions or through regular annual budgets, to take on the increased workload that we have called upon them to take.

I share your sentiment. I think the leadership, not just at the level of the director general, but among the number of the deputy director generals and throughout the staff, is absolutely first rate.

I guess the bottom line is our sense is the IAEA is a very serious, very sober, and very professional organization, and one in which we feel very confident in working closely with as well as other member nations through this international organization to deal with issues of nuclear security that we have talked about.

Mr. FORTENBERRY. Thank you all very much.

Mr. FLEISCHMANN. Thank you. Mr. Visclosky, do you have any questions, sir?

Mr. VISCLOSKY. I do. Perhaps you can go to Ms. Kaptur first.

Mr. FLEISCHMANN. I will recognize Ms. Kaptur first. Ms. Kaptur?

Ms. KAPTUR. Yes, as the afternoon wears on, you know we get more creative. In listening to your plea for follow-on staff, filling the bench that is coming forward, it reminded me—I will just tell you the world I live in, from Toledo, Ohio to Cleveland, with lots of universities and lots of young people thinking about what their future is going to be.

I recently spoke with the new head of the Berkeley Lab, Mike Witherell. I said one of the things we need, whether you are the man or we find somebody—when I was growing up there was something called “Mr. Wizard.” Mr. Wizard used to be on TV, and I watched that. That was a really good show. You are too young.

I said we need a Mr. Wizard out there somewhere. I was thinking about two science centers that I represent, one in Toledo called Imagination Station, and one in Cleveland called the Great Lakes Science Center. Thousands of children go through there every year.

They have no clue who you are or what you do or even that you exist. We have no lab in our part of the country. We have great engineering schools, great scientists, but the Federal Government does not really meet in my region very effectively.

A couple of years ago we had Sailor of the Year from Toledo, Ohio, but you cannot get one of your subs up the St. Lawrence Seaway, I guarantee you that, Admiral.

Admiral CALDWELL. You never know where we show up.

Ms. KAPTUR. I am waiting. My point is your budget is quite sizable, and there are lots of funds spent on communication and messaging. You may not be the proper place in the Federal Government to do this, Ms. Harrington, but I really want to push you a little bit to think about the assets that you do have, and how one would develop broadcasting a programming that would link to our science centers.

You must have old collections. You must have very interesting materials stored in warehouses all over the place. I am not the only representative who has these incredible institutions in their communities trying to help raise the next generation and trying to find a way to engage them.

Now, there is a man that broadcasts, and I have no investment in his company or I do not even know if he has a company or if it is a nonprofit, named Bob Ballard, who goes and finds all the ship wrecks. He works for National Geographic some of the time, and the kids are, you know, this is really a big deal.

We had an old tanker that went down in Lake Erie many decades ago. Just getting all the oil out of that thing and doing it in the right way, virtually showing it on a big screen in these science centers. The kids get really interested.

I know you work at such a different level, but there just might be a way of bringing some individuals in from these science centers and just talking to them, do a convening from places like I represent across the country, and link to them and the teachers that are taking these thousands of kids, can you imagine what that is like, school lunches, everybody has to have boots on, and you have to take them down there, and they go through these exhibits.

Can you imagine whatever you could draw from the nuclear Navy, what you might have there, and these kids would be interested.

General Davis, whether it is additive manufacturing, we have some of these platforms and these science centers, but what you might bring to it, and from the science arena, Ms. Harrington, what you must have that you cannot communicate to us here but maybe something in there, is finding somebody like a Bob Ballard. I am not pushing him but he knows how to reach the public.

I think you could really be a force, you could really be a force out there, and I do not even like the name "STEM." I always say "STEAM," because if you do not have the arts, the rest of it does not really work. So, I always talk about STEM, not STEAM. You have to have the other half of the brain there, too.

I just think we shortchange our children, especially from Washington, because we seem so far away, but I just urge you to think about a mechanism to draw in—you know, General Klotz, you can think of a way to do this, particularly the Department of Energy is far removed from the ordinary person compared to something like the SBA, you know. That is on the ground and they have agents and all these other things going around, or the FBI.

I would just urge you to consider that. You might have something to offer, and I thank you.

Admiral CALDWELL. Can I offer a comment on that? I think you might be surprised if you were to go around to naval institutions around the United States, and I would venture to say even Army, Air Force, Marine Corps institutions, that you would find in the public a lot of military members involved in their communities in advancing STEM and probably STEAM to some extent.

There are a variety of programs out there, things from robotics to developing undersea vehicles. I know some folks in my headquarters have been involved in things they are interested in, and

helping students learn about science, and even the labs have folks they have sponsored and brought in that pursued science.

So, there is a lot of that that goes on at various levels across the United States with service members and people who are in the Federal Government that are interacting with folks on a human level and developing interest in science.

Ms. KAPTUR. Thank you, Admiral. I was thinking of a man that works for our court system in one of the counties I represent. He takes children that have been through the court system—he is actually a parole officer—but one of the projects that they involved hundreds of children in is building ships, seaworthy vessels to go out on the Great Lakes. Can you imagine that? These kids are just into it. We have not lost anybody yet.

I am hearing what you are saying, but I am thinking if you could create a spot for it inside the department, and we did not have a chance to mention that to the Secretary this morning.

By the way, I have to say yesterday the Medal of Honor was presented to a wonderful member of our Armed Forces who was born in Toledo, my home, and grew up in Grand Rapids, Ohio, which I used to represent and do not any longer, but we are very honored by his service.

Mr. FLEISCHMANN. I want to thank the ranking member for her comments. Thank you very much. Mr. Visclosky?

Mr. VISCLOSKY. Thank you very much, Mr. Chairman. Mr. Administrator, a recent National Academy of Sciences' report recommended a clean slate approach to building new nuclear weapons and building prototypes in order to exercise design and production skills.

Do you agree with the recommendation, and do you believe NNSA and the labs should be focused on building prototypes, and if so, do you have any sense on the cost and how it compares with other priorities you have today?

Mr. KLOTZ. Thank you, Congressman. That is a very important question. I think within the NNSA and within the DOE, we certainly recognize the importance of exercising our capability to do the whole range of activities associated with nuclear weapons from cradle to grave, design, development, manufacturing, prototype building, and testing.

Now, there was a letter sent from each of the laboratory directors that were sent at the request of the Senate Armed Services Committee which addressed the importance of all this, but the sense I took from that is a lot of the work associated with that kind of chain of activities is already being done in the very robust scientific and technical work that is done in support of the stockpile stewardship program and life extension programs.

There was a report that was recently rendered that talked about the possibility of prototyping, and there is some congressional language that directs that, I think in the NDAA. That language was passed relatively late in the year, in December 2015, of course.

So, we have been looking at how we would operationalize that, recognizing there is costs associated with that, that there are a lot of other priorities within the NNSA portfolio, that if we are going to do a program in this particular regard, we need to vet it as a program that would require the Nuclear Weapons Council blessing



of it as well as appropriation authorization from the Congress to do that.

Well before this congressional language came down, General Davis' folks had already established a thing called the "Defense Program Advisory Committee," and that is one of the things we specifically asked them to take a look at, and they are expected to report out in the early part of this year.

So, this is something under active consideration. I think we are actually doing more in this area than we often recognize we are or are given credit for.

Mr. VISCLOSKY. If I could ask, on the interoperable warhead, how much work is slated to be done in 2017, if any at all, and how much capability are you retaining to support the interoperable warhead, which was deferred at least 5 years from 2015 to 2020?

General DAVIS. Sir, within the actual program for the W78-1, there is no money asked for in fiscal year 2017. Within the RDT&E program, we will be doing some work that will prepare for certification of that system, and to make sure that we understand the challenges with certifying a system that will have a common nuclear explosive package.

Mr. VISCLOSKY. Okay.

Mr. KLOTZ. On some of the work that was done, there was a 120-day study after that work terminated to make sure we fully captured and archived the work that had been done up to that particular point.

As General Davis indicated, the timing of that was moved to the right because of other priorities within the budget and a question of when do we need that kind of capability, and as I mentioned earlier, it comes up with the need to do a life extension program or do something with the W78 warhead.

Mr. VISCLOSKY. Okay. Right before we broke for votes earlier in the hearing, you had talked about deferred maintenance, and I think the backlog was \$3.7 billion. I also understand that reportedly by 2019, NNSA may have up to 600 excess facilities.

Closing facilities, despite people's assumption that it is easy to do, I appreciate that it is not, but also to the extent you can save money on deferred maintenance on facilities that are no longer needed by the United States of America, it is a savings.

Where is the administration on that and what difficulties are you facing? Is it a question of money or any help that the committee can give to you? I do not diminish the problem of closing anything.

Mr. KLOTZ. There are two major problems. The most important one is, of course, money to do that. As I mentioned earlier in a constrained budget environment, the first dollar always goes to the mission and to the people who perform that particular mission. These other things get deferred.

To actually give you the numbers, at the end of fiscal year 2015, which just passed, we had 421 excess facilities in NNSA, 90 of which we identified as high-risk facilities.

Now, the other problem, of course, is some of our facilities are contaminated, so before we either demolish them or turn them over to Environmental Management to do the demolition and disposition of it, we have to do some remediation associated with that. That

also is both technically challenging and costly. But we are ramping up the things that we want to do in the area of disposition.

One of the most important things, in this particular budget, is we just opened up, a year or so, a new facility in Kansas City. We got out of a 3.2 million square foot World War II-era production facility into one half the size, a lot less expensive to operate, far more efficient, and we are asking for money in 2017 to disposition that by turning it over to a private developer, which can disposition that facility for about \$200 million, where we estimated it would cost the Federal Government \$900 million. That will take a lot of our square footage out.

Mr. VISCLOSKY. Taking Kansas City as an example, is there much as far as job loss in communities that are attached to some of these excess facilities or is it simply a question of they are not efficient for other uses at that location, they are simply not being used for the purposes of NNSA? I assume at some point there are considerations of potential job loss in communities.

Mr. KLOTZ. No, sir. I would have to go back and dig into that. My initial reaction is no.

Mr. VISCLOSKY. That is not part of it?

Mr. KLOTZ. It is not part of it, because we move those people into other facilities as we build other facilities. In every facility, for instance, if we create a new facility to do a particular type of operation, the facility that people leave to go into that, we take a look at it and say could this be repurposed, could it be used for other purposes, or is the condition of the facility such that it is time to get rid of it.

Mr. VISCLOSKY. Okay.

Mr. KLOTZ. We used to have a rule when I was in the Air Force to build a building, tear a building down, unless you had some other purpose for it. That is an aspiration that is not always backed up by the funds to do it.

Mr. VISCLOSKY. One final point and more of a point having worn a number of hats on this subcommittee, and remembering conversations and directives from the committee on lab directed research, looking at my notes for the hearing, I understand there are new accounting rules that went into effect in October.

I also understand that the Laboratory Commission made certain recommendations, and I hope after all of these years we are making some progress on that.

Mr. KLOTZ. I am not the expert—

Mr. VISCLOSKY. Overhead. *deja vu* here.

Mr. KLOTZ. Yes, I know that came up in the testimony earlier with the Secretary, and it is something I am not the expert on in terms of that, other than to say—

Mr. VISCLOSKY. You need to be.

Mr. KLOTZ. I know. There has been some legislation that set a floor of no less than 5 percent, no more than seven percent on that.

I will tell you when I talk to the laboratory directors and the plant directors for plant directed research and development, they say this is one of the most important tools they have in terms of recruitment, in terms of retention of qualified individuals, and in terms of actually doing some leading edge science.

Mr. VISCLOSKY. I would not argue that point, but there are limitations. Thank you. Thank you, Mr. Chairman.

Mr. FLEISCHMANN. Thank you, Mr. Visclosky. I believe we will conclude our hearing today. I want to thank each and every one of you for your service to our country and for performing the vital tasks that NNSA does for our great Nation.

With that, we will gavel out.

Mr. KLOTZ. Thank you, sir.

**QUESTIONS FOR THE RECORD**  
SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT  
HOUSE COMMITTEE ON APPROPRIATIONS

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**Hearing on the 2017 Budget Request  
for the National Nuclear Security Administration  
Tuesday, March 1, 2016**

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## ALIGNMENT OF LONG-TERM NUCLEAR MODERNIZATION PLANS

Subcommittee. Mr. Administrator, the GAO recently found that the NNSA's long-term modernization requirements exceeded the Administration's funding plans by \$4.2 billion, raising concerns about the alignment of NNSA's programmatic plans with future anticipated budgets and the impact of future competing demands on the stockpile life extension programs (LEPs).

What programmatic needs are currently not funded within the long-term budget estimates? Where might those potential shortfalls be realized?

Administrator Klotz. I am confident that the FY 2017 President's Budget for NNSA meets all of our national nuclear security requirements.

We will be able to do so because the President and Congress reached an agreement last fall to raise the FY 2017 sequester cap in the Bipartisan Budget Act. This provided us the necessary flexibility to put together a responsible FY 2017 budget.

In future years, continued Congressional support is necessary for our long-term stockpile sustainment strategy and sustainment of our nonproliferation and prevention and response capabilities are at risk. Continuing resolutions put that strategy at risk.

Subcommittee. What are you doing to ensure that the decisions you are making now to set requirements on these very large and expensive multi-year programs and projects are resource-informed and not reliant on large increases in future annual budgets that may or may not be realized?

Administrator Klotz. NNSA's FY 2017 President's budget reflects hard decisions and tradeoffs to meet both military commitments and nuclear security priorities. The proposed program is highly integrated and interdependent across the four accounts. NNSA is committed to managing its operations, contracts and costs in an effective and efficient manner.

## SPENT FUEL RECAPITALIZATION

Subcommittee. Admiral, your budget request reports that the legacy spent fuel facility will have to operate for another 5-12 years after the new facility comes online in order to provide spent fuel examination capabilities.

Why weren't the examination capabilities included in the design of the new facility?

Admiral Caldwell. A phased approach for recapitalizing the operations currently conducted in the Expended Core Facility was selected based on the feasibility of funding under existing budgetary constraints. To address the most immediate need of the Navy, spent fuel handling recapitalization, the new Spent Fuel Handling Recapitalization Project facility is the first recapitalization effort being addressed and will enable the uninterrupted availability of the nuclear powered fleet. Naval Reactors' examination capabilities are tentatively planned to be recapitalized in future phases: core examinations recapitalization and irradiations examination recapitalization.

Subcommittee. NR was working with the Office of Nuclear Energy on a partnership for new spent fuel examination facility, but those plans have not been advanced. What is the status of this effort? Could a joint project meet the needs of both programs?

Admiral Caldwell. In accordance with DOE Order 413.3B, Program and Project Management for the Acquisition of Capital Assets, Naval Reactors (NR) is currently in the process of establishing the mission need for the recapitalization of the core examinations capability currently provided by the Expended Core Facility. Once that is established, NR can formally begin to develop an analysis of alternatives for this effort, including alternatives that would meet the joint needs of NR and the Department of Energy – Office of Nuclear Energy. Additional efforts are underway to develop a strategy for the recapitalization of NR's irradiations examination capability.

## ADVANCED TEST REACTOR

Subcommittee. Admiral, the Advanced Test Reactor (ATR) serves an important role for our nuclear navy, as well as for the Department's civilian nuclear energy research and development programs. ATR is an aging reactor that will require investment to keep it operating into the future. Your office has been working with the DOE Office of Nuclear Energy to develop a plan that addresses the recapitalization needs of ATR. Your budget request provides \$68.6 million for ATR, a reduction of \$8.6 million from last year's level (which included recapitalization funding).

Is there any funding in your budget request to support extending the life of ATR?

Admiral Caldwell. Department of Energy – Office of Nuclear Energy (DOE-NE), Naval Reactors (NR), and the contractor that operates the Idaho National Laboratory performed a thorough, collaborative analysis of issues affecting plant reliability. Last year, the team agreed to a five-year funding strategy and plan for plant health investments. NR's budget request for ATR (\$68.6M in FY 2017), when combined with DOE-NE's FY 2017 budget request, fully supports ATR's operating requirements as well as the agreed upon five-year funding strategy. NR will remain tightly engaged with DOE-NE to ensure future budget requests collectively reflect ATR's operations and plant health investments.

Subcommittee. What is the status of the joint planning effort?

Admiral Caldwell. The joint planning effort is complete. The FY 2017 budget request reflects the agreed upon five-year funding strategy. NR and DOE-NE will remain tightly engaged to ensure future budget requests collectively reflect ATR's operations and plant health investments.

Subcommittee. Within NR's budget, where do you prioritize funding for this recapitalization and why?

Admiral Caldwell. This funding is prioritized within Naval Reactors Development's sub-category for the Advanced Test Reactor to explicitly track and manage the allocated level of funding.

## MOX LIFECYCLE COSTS

Subcommittee. Mr. Administrator, late in the budget cycle last year, DOE submitted an independently-verified lifecycle cost estimate for the MOX and an assessment from a “red team” of experts tasked by the Secretary of Energy to review that estimate and others prepared by outside groups. The Red Team found significant limitations of all the estimates, which varied considerably depending on what assumptions were made (such as annual funding levels). To date, Congress has not been provided an “apples to apples” comparison that we have confidence in.

What cost assumptions are currently using for completing construction on the MOX project? What annual funding amounts are assumed to meet those costs?

Administrator Klotz. The two funding assumptions that are being used for the development of a new Performance Baseline cost estimate for the MOX facility as directed by the FY 2016 NDAA are \$500M/year and \$350M/year. However, the \$350M/year scenario is the most consistent with the recent funding levels that the project has received and spent.

There have been several efforts over the last two years to analyze the MOX fuel approach and alternatives. Consistently, these reviews have concluded that the projected lifecycle costs of the MOX fuel approach for plutonium disposition will be in the range of \$30-\$50 billion and will require approximately \$800 million to \$1 billion annually for decades through the life of the MOX fuel program.

Subcommittee. The fiscal year 2016 NDAA directed the NNSA to re-baseline the MOX project and the Omnibus directed the NNSA to provide a better estimate for the full costs of the dilute and dispose alternative.

Do you intend to move forward to re-baseline MOX and prepare a full cost estimate of the dilute and dispose in a timely manner? When can we expect those cost comparisons to be available?

Administrator Klotz. The Department is in the process of updating the performance baseline for the MOX Fuel Fabrication Facility. We expect this estimate to be completed in FY 2016.



In addition, the Department will continue the development of a detailed lifecycle cost estimate for the dilute and dispose approach for plutonium disposition in FY 2017. The lifecycle cost estimate will be independently validated in FY 2018.

## NUCLEAR INCIDENT RESPONSE OPERATIONS

Subcommittee. Mr. Administrator, nuclear emergencies don't happen every day, but when they do all facets of response must perform flawlessly. In the emergency operations and counterterrorism and nonproliferation area, the standards we expect from these operations when something goes wrong is high. NNSA has set various contracting goals that have distinct advantages but sometimes these changes can be disruptive. The NNSA is undertaking new responsibilities to manage emergency operations for the entire department.

Do you expect these new responsibilities to result in any changes to how DOE manages its emergency response assets and incident response teams?

Administrator Klotz. We expect the organizational changes to better delineate responsibilities for coordinating nuclear incident response assets from those for managing emergencies at DOE facilities, and have a positive impact on preparedness for both.

Subcommittee. Are any new contracting models being considered and if so, how important is continuity of operations?

Administrator Klotz. NNSA is committed to implementing an effective and self-sustaining Emergency Management Program to continue improving emergency management preparedness and core response capabilities for all-hazards events, including continuity operations. As new requirements are identified, NNSA will consider best practices in contracting models and will ensure emergency response organizations, teams, and assets are fully integrated and ready to respond during a Departmental operational emergency or major national crisis.

## NNSA MANAGEMENT

### OVERALL DEFENSE BUDGET PLANNING

Subcommittee. Mr. Administrator, the President's Budget Request of \$551.1 billion is equal to the amount allowed under the Bipartisan Budget Act of 2015, which gave a boost to both defense and non-defense spending categories for two years. From 2018 to 2021, the remaining years of the BCA period, the requested defense levels are \$113 billion higher than the limits currently allowed under the law.

What activities in the NNSA's five-year plan would be impacted if the caps remain in place?

Administrator Klotz. If the caps remain in place, NNSA would balance priorities among the near-term and long-term needs of managing the stockpile to include life extension programs; necessary sustainment and recapitalization of infrastructure; essential investment in research, development, test, and evaluation; and activities to maintain the expertise of the highly- skilled workforce to ensure a responsive capability.

Subcommittee. How would you absorb potential reductions to your current budget levels if they are necessary to fit within the caps in 2018?

Administrator Klotz. It will fall to the next Administration to work with Congress to establish a resource informed long-term plan to provide a firm foundation for the Nation's nuclear security posture.

## MAINTENANCE BENCHMARKS

Subcommittee. Mr. Administrator, there's been increasing concern that despite the large increases in the NNSA's budget over the past five years, NNSA is still failing to meet standard benchmarks for standard maintenance.

Administrator Klotz. More than 50% of NNSA's facilities are over 40 years old, with nearly 30% dating to the Manhattan Project era. NNSA has requested increased funding to repair and recapitalize NNSA's infrastructure. The FY 2017 budget request will allow NNSA to begin reducing deferred maintenance and arresting the decline of NNSA infrastructure.

Subcommittee. What are the general benchmarks that DOE uses to determine how much should be spent on maintaining its facilities and does this budget request meet them?

Administrator Klotz. Regarding benchmarks, DOE uses findings from the National Academies of Science, *Key Performance Indicators for Federal Facilities Portfolios: Federal Facilities Council Technical Report Number 147 (Washington, D.C.: 2005)*. The findings suggest that 2% of Replacement Plant Value (RPV) should be invested annually for infrastructure in good condition. However, for infrastructure in poorer condition, annual investments should be closer to 4% of RPV. NNSA's requested increase in Maintenance and Recapitalization funds for FY 2017 would put NNSA's investment at 3.1% of RPV (up from 2% in FY 2015 and 2.5% in FY 2016).

Subcommittee. How much of your budget request would be considered to be catching up on deferred maintenance that was put off in previous years?

Administrator Klotz. There is no single budget line or request that buys down deferred maintenance. However, investments in Maintenance and Recapitalization have a direct impact on reducing deferred maintenance. Over the past three years, NNSA has slowed the annual growth of deferred maintenance from \$380M in FY 2012 to ~\$100M/year. In FY 2016, NNSA investments in Maintenance (\$277M) and Recapitalization (\$254M) will

stop the growth of deferred maintenance. The FY 2017 budget request provides sufficient Maintenance (\$294M) and Recapitalization (\$555M) to allow us to begin reducing deferred maintenance and arresting the decline of NNSA's infrastructure.

## COST EFFICIENCIES

Subcommittee. Administrator Klotz, The requirements of the NNSA's infrastructure and stockpile modernization program continue to grow. A few years ago, the Department of Defense's office of cost analysis provided some recommendations on some potential efficiencies that could be implemented to lower costs and improve the affordability of the modernization program.

Did you implement any of these recommendations?

Administrator Klotz. The Department of Defense Office of Cost Assessment and Program Evaluation (CAPE) recommended efficiencies in two areas over the FY 2014-2018 Future Years Nuclear Security Program (FYNSP): 1) management efficiencies in the cost of doing business, and 2) workforce prioritization in how NNSA manages its staffing needs within the weapons program.

NNSA's FY 2014 Congressional Budget Request identified \$82 million in savings from reducing the costs of doing business, slightly exceeding the \$80 million goal set by CAPE. In July 2013, NNSA and our Management and Operating (M&O) partners established the NNSA Operations Council to drive credible, measurable, and achievable operational efficiencies. The Council is comprised of the NNSA Chief Operating Officer (COO), and all of the Lab and Plant COOs. For the FY 2014 Budget, the following efficiencies were identified:

- Reduce, voluntarily, staff at the Lawrence Livermore National Laboratory (LLNL) (399 FTEs - \$60 million)
- Reduce, voluntarily, staff at the Nevada National Security Site (43 FTE - \$6.6 million)
- Reduce Integrated Contractor travel expenses: \$9 million
- Defer certain security improvements at NNSA sites: \$5.3 million
- Hire LLNL Security Police Officers (SPOs) at Y-12/Pantex rather than new individuals, thus eliminating costs of training and clearances: \$0.8 million

NNSA was unable to identify requirements that could be curtailed to facilitate a workforce shift to other priority needs because reassigning staff

would impact NNSA's core stockpile stewardship programs. NNSA determined pursuing these CAPE-identified targets could harm NNSA's ability to certify the safety, security, and effectiveness of the nuclear stockpile, which is a fundamental DOE mission.

Subcommittee. Is it possible to make the NNSA laboratories and production sites more cost efficient? What reforms do you think would make the largest impact?

Administrator Klotz. NNSA continues to strive for costs savings in support of mission activities. NNSA laboratories and production sites have become more efficient, and are committed to increasing efficiency in the operations, management, and administrative functions associated with a diverse array of national security missions. They are constantly striving to achieve more effective and efficient ways of doing business, which is absolutely critical to successfully fulfilling programmatic requirements while also maintaining and modernizing an aging infrastructure. Changing the benefit structure, looking at indirect activities, and changing procurement strategies will continue to drive most efficiencies.

In November 2014, the NNSA Administrator tasked NNSA Field Office Managers (FOM), in coordination with Management and Operating (M&O) partners, to prepare an annual report identifying efficiencies achieved during the previous year (2014) and potential actions for the coming year (2015) and beyond. Within that overall guidance, M&O's were also asked for ideas on specific changes NNSA could make, from an oversight and governance perspective, that would enhance productivity at NNSA sites, while also making oversight less costly and less burdensome.

In April 2015, NNSA produced its first annual report, shared with Congressional oversight committees, with a summary of measures identified and implemented by the NNSA sites in 2014 to improve operations and reduce costs. NNSA is in the process of preparing this year's report, which should be available in the near future.

LABORATORY DIRECTED RESEARCH AND DEVELOPMENT  
(LDRD)

Subcommittee. Mr. Administrator, this year, DOE implemented direction in the FY15 Omnibus to better account for funding provided to the Laboratory-Directed Research and Development program. The new accounting rules went into effect on October 1, 2015.

What have been the impacts of transitioning to this new accounting structure? Have you noted any particular benefits or drawbacks to the LDRD program?

Administrator Klotz. The FY15 Omnibus required that no individual program, project, or activity be charged more than the statutory maximum. This law affected the labs' accumulation process and also removed the LDRD Program costs from the base. The result is a reduction in the effective rate from 6 percent to approximately 5.6 percent (varies by laboratory), if a Laboratory chooses to collect the maximum amount. This change has reduced the number of LDRD projects which can be approved and funded, and may negatively impact the ability of the labs to attract and retain technical staff.



## WEAPONS ACTIVITIES

### B61 LIFE EXTENSION PROGRAM (B61 LEP)

Subcommittee. Mr. Administrator, the B61-12 is one of the most expensive life extension programs the NNSA has ever undertaken. Early on, there was considerable debate whether it could be completed within the NNSA's \$8 billion cost estimate. So far, there have been some notable successes, but we also have reports that the project is understaffed. And the GAO recently stated that the B61 LEP is operating on a constrained schedule with little if any margin left to deal with program risks.

Is the B61 on track to be completed within the NNSA's cost estimate?

Administrator Klotz. The B61 is on track to be completed within NNSA's cost estimate. NNSA is submitting quarterly Selected Acquisition Reports to Congress that indicate the program is within cost and on schedule. The program will formally update the cost estimate following the Baseline Design Review in order to establish an Acquisition Program Baseline as required for Phase 6.4 approval in June 2016. The B61-12 Life Extension Program (LEP) continues to meet its development milestones, and is on schedule and within budget to meet a March 2020 first production unit.

Subcommittee. Are you having any challenges that might impact your ability to meet your production requirements or to deal with program risks? Can you please give us an update on where you are?

Administrator Klotz. There are no current challenges to our ability to meet production requirements. The most significant risks to execution of the B61-12 LEP are continuing budget resolutions, budget sequestration, and Government shutdowns that can affect execution of production schedules and create funding uncertainties. In order to mitigate such risks, NNSA is carefully managing annual work packages and using risk-based contingency to minimize the effects of short-term budget gaps. NNSA will continue to engage with Congress to communicate the need for consistent funding and support for the B61-12.

Subcommittee. Is there a continuing risk that there could be gaps in meeting U.S. commitments to our NATO allies?

Administrator Klotz. NNSA will fulfil its requirements to ensure the United States satisfies its commitments to our NATO allies. The B61-12 LEP will sustain the strategic and extended deterrence capabilities of the United States, and enable stockpile reductions that will reduce the costs of maintaining a safe, secure, and effective nuclear deterrent.

## LEP ANALYSIS OF ALTERNATIVES

Subcommittee. General Davis, the larger scope for refreshing the high explosives was added late in the procurement process for the upcoming refurbishment of the Navy's W88. Previously, the NNSA requested funding for the Integrated Warhead W88-1, but that effort was not funded by Congress and is now pushed back. The B61 LEP was held up significantly while the costs of the different alternatives could be developed.

Why does NNSA continue to struggle in the early stages of formulating these major refurbishment efforts?

General Davis. The Nuclear Weapons Council (NWC) authorized the Development Engineering (Phase 6.3) for the W88 Alt 370 in October 2012 to pursue replacement of the Arming, Fuzing, and Firing subsystem and enhancement of nuclear safety concurrent with the replacement of the warhead's gas transfer system and neutron generators. The initial required scope did not include a conventional high explosive (CHE) refresh, but the NWC added this scope in November 2014. The decision to refresh the CHE was based on analysis by Los Alamos National Laboratory (LANL) that began in 2014 and was subsequently peer-reviewed by Lawrence Livermore National Laboratory (LLNL). This decision occurred well past the feasibility and cost study stage (Phase 6.2/2A) of the Alt 370 program.

The 6.2 (Feasibility Study and Design Options) Study for the IW-1 (W78/88-1) life extension program (LEP) was authorized by the Nuclear Weapons Council in June 2012. Its deferral to a first production unit of FY 2030 in the FY 2015 FYNRP (based on deliberation in early 2014) was a consequence of budget constraints and deference to the priority given to the Air Force cruise missile warhead (now the W80-4 LEP).

NNSA and the NWC have a very deliberate process (Phase 6.X) for managing life extension programs (LEPs) and major alterations. The process begins with a conceptual assessment of the requirements that the Department of Defense provides. In the case of the W88 Alt 370, as noted, the requirements changed several years after the start of the process. In the case of the IW-1, there is an interplay between the planning for these efforts and their resourcing by the planning, programming, budgeting and evaluation (PPBE) process in which we allocate resources based on

priorities for the entire Weapons Activity program. The deferral of the IW-1 LEP was not a failure in the 6.X process, but a decision driven by the need to prioritize.

Subcommittee. Is it a matter of better cost estimating early on or taking more time to formulate a better set of alternatives? What can be done to improve the process?

General Davis. The cost estimates developed for the various B61-12 LEP options did take longer than expected due to the need to develop additional options, and the fact that their associated costs were more affordable than those originally considered. This also reflects the interplay between 6.X planning and the PPBE resourcing process.

Recognizing the importance of credible cost estimates, especially for LEPs, Defense Programs created its Office of Cost Policy and Analysis in 2010 and has made significant strides since then in improving the processes, data, and discipline used in producing cost estimates for major efforts such as LEPs. In addition, NNSA's Office of Cost Estimating and Program Evaluation will complete independent cost estimates for the B61-12 LEP and W88 Alt 370 in FY 2016. All LEPs and major alteration programs are on schedule and within budget.

## EXCESS NUCLEAR FACILITIES

Subcommittee. Mr. Administrator, disposing of excess facilities lowers the overall operating and infrastructure costs and reduces the risks posed by these deteriorating facilities. The NNSA previously reported that by 2019, NNSA will have more than 600 excess facilities that are not required for current or future mission work.

Have you made it your goal to reduce the overall NNSA footprint?

Administrator Klotz. Twelve percent of NNSA infrastructure is excess to program needs. These excess facilities are a drain on resources and pose risk to safety, security, and program objectives. NNSA's goal is to dispose of these excess buildings. DOE's Office of Environmental Management (EM) has the responsibility to dispose of many of the highest-risk NNSA facilities because they are process-contaminated. NNSA is working to dispose of facilities under its authority and reduce the risk of facilities that will be transferred to EM for disposition.

Subcommittee. How much funding is in this budget request for D&D activities and can you describe what can be accomplished over the next five years?

Administrator Klotz. The FY 2017 budget request provides \$247.3 million in FY 2017 to address excess facilities by:

- Transitioning the Kansas City Bannister Federal Complex to the private sector for redevelopment (this would eliminate 2.93 million square feet of excess facilities);
- Conducting major risk reduction activities at Y-12's Building 9201-5 (Alpha-5) and Building 9204-4 (Beta-4);
- Disposing of the TA-16-430 High Explosives Pressing Facility at Los Alamos National Laboratory (LANL) and Buildings 9111 and 9112 at Y-12; and
- Funding stabilization and characterization at other high-risk facilities enterprise-wide.

## BANNISTER ROAD TRANSFER AT KANSAS CITY

Subcommittee. Mr. Administrator, the infrastructure recapitalization program includes a one-time payment of \$200 million to transfer the legacy Bannister Road complex in Kansas City to the private sector.

What are the NNSA's plans to transfer the facility?

Administrator Klotz. NNSA is requesting \$200M in FY 2017 to dispose of the 2.93 million square foot Kansas City Bannister Road complex, a high-risk facility that was formerly home to the Kansas City Plant. NNSA moved operations to the Kansas City National Security Campus in FY 2014. NNSA plans to transfer the Bannister Road complex to the private sector for environmental remediation and redevelopment in March 2017, assuming the President's budget is fully funded and all funding is received by NNSA in February 2017.

Subcommittee. Has an agreement already been reached that the cost to the government will be capped at \$200 million, or could that figure change?

Administrator Klotz. The \$200M cost to the government is based on an initial cost estimate from the private developer CenterPoint Properties (CPP) and includes contingency estimated by NNSA. Since this initial cost estimate, NNSA awarded a contract to CPP in September 2014 for site characterization. To date, CPP has completed necessary field work for environmental due diligence and has drafted a remediation plan, which NNSA received in April 2016 along with an updated cost estimate. NNSA declared that draft plan and cost estimate sufficient to begin negotiations in June 2016. NNSA is also conducting an independent cost estimate. CPP's cost estimate to perform demolition and remediation of the Bannister Road complex will not be considered final until Federal, State, and local regulatory approval of the remediation plan and final agreement with the Governor of Missouri planned for January 2017.

Subcommittee. When will the NNSA begin to realize the \$100 million per year in operating savings at Kansas City that it promised would occur at the beginning of the recapitalization?

Administrator Klotz. NNSA began realizing the vast majority of the \$100M per year operating savings at Kansas City upon the move to the new National Security Campus in August 2014. However, NNSA must continue to pay approximately \$20M per year to maintain the Bannister Road complex in a safe, secure condition until it is transferred to the private developer in March 2017.

## NATIONAL SECURITY NEEDS FOR ENRICHED URANIUM

Subcommittee. Mr. Administrator, the Department made an announcement in early September that it did not intend to renew a contract to operate uranium enrichment centrifuges at Piketon that it had constructed as part of a demonstration project. Several members of Congress have voiced concerns regarding the national security importance of having a uranium enrichment capability to support the U.S. nuclear weapons program and Naval Reactors.

Why does NNSA believe it does not need an enrichment capability at this time?

Administrator Klotz. Current enriched uranium requirements are supplied from the United States' Highly Enriched Uranium (HEU) stockpile. To meet diverse needs, the Department repurposes or down-blends HEU from dismantled weapons that were declared excess to defense needs. The Department estimates it has sufficient quantities of material available to fulfill the need for enriched uranium through at least FY 2040.

Subcommittee. How soon exactly do you believe this capability will be needed and have you fully validated that date?

Administrator Klotz. There are three types of material required for national security missions and each of the respective dates have been verified. The need date for new low-enriched uranium for tritium production is potentially as soon as 2038-2041, but possibly significantly longer. The need date for a new source of fuel for naval reactors is potentially as soon as 2060. The need date for a source of enriched uranium to meet non-defense national security missions is between 2025-2030, however these requirements may be able to be met with enriched uranium that can only be used for non-defense purposes.

Subcommittee. If we are going to restart the process of building out a new capability in as early as five years, why terminate a project that you already had up and running?

Administrator Klotz. It has not been determined that a new capability is needed such that build out would have to be within five years.



Additionally, the demonstration cascade project operated by Centrus Energy Corporation utilizing the AC100 technology was terminated following a period of successful validation of the capabilities of the AC100 centrifuge technology. The operations provided the Department with valuable data and operational expertise to ensure the reliability and efficiency of the AC100 technology for future deployment. The cost of maintaining the facility while an acquisition plan is developed far outweighs the cost of continuing to operate at that scale, however. Additionally, continued operations would require significant funding to complete necessary modifications to the centrifuges and infrastructure.

## DOMESTIC URANIUM ENRICHMENT BUDGET REQUEST

Subcommittee. General Davis, the Defense Programs budget request contains \$50 million for domestic uranium enrichment, half the amount that would have been needed to continue to operate the Piketon facility but still a significant amount of funding.

If NNSA is no longer operating centrifuges, why do you need these funds?

General Davis. Current efforts are focused on preserving and advancing the AC100 centrifuge technology while beginning work on the small centrifuge design, which will be developed in FY 2016 – 2019.

Subcommittee. What are the near-term goals of your domestic uranium enrichment program exactly and have you set any parameters and guidelines for what the research program will focus on?

General Davis. The program is executing a two-pronged strategy:

- Preserve and advance uranium enrichment expertise and technology by conducting research and development activities to improve knowledge of uranium enrichment and processing while establishing and maintaining a core of personnel, laboratories, and equipment.
- Down blend highly enriched uranium (HEU) from the uranium inventory to provide unobligated low-enriched uranium (LEU) to extend the tritium fuel need date to 2038– 2041.

The FY 2017 Future Years Nuclear Security Program provides funding for technology development through FY 2018 and for down blending activities in FY 2019 through FY 2021. HEU down blending will take place through FY 2025 to provide unobligated LEU for tritium production from 2030 to approximately 2041.

Subcommittee. How will you evaluate progress of the continuing R&D program?

General Davis. We will convene an independent evaluation panel as one part of our process, as well as use internal experts to determine progress on a regular basis.

**NAVAL REACTORS**

**OHIO-REPLACEMENT COST INCREASES**

Subcommittee. Admiral Caldwell, last year, the five-year projections for Naval Reactor’s costs to develop the reactor for the Ohio-replacement were supposed to be only \$157 million for fiscal year 2017. Your budget request this year is \$213 million. That’s an increase of \$57 million, or 36%, over the costs previously provided to this Committee.

Are these increases due to a change in the program plan or are there overall cost increases associated with development of the reactor systems?

Admiral Caldwell. There have been no cost increases for the reactor system development work for the OHIO-Class Replacement (OR). FY 2016 President’s Budget (PB16) identified OR requirements for FY 2017 as \$213M and FY 2018 as \$157M. The same requirements for FY 2017 and FY 2018 are also identified in the PB17 budget submittal. A comparison table of PB16 and PB17 requests is below:

<b>TY\$M</b>	<b>FY14</b>	<b>FY15</b>	<b>FY16</b>	<b>FY17</b>	<b>FY18</b>	<b>FY19</b>	<b>FY20</b>	<b>FY21</b>
<b>PB</b>	126.4	156.1	186.8	213.7	156.7	138.0	75.5	64.7
<b>PB</b>	126.4	156.1	186.8	213.7	156.7	138.0	75.5	64.7

Subcommittee. What is the total cost of developing the reactor for the Ohio-replacement and does your five-year plan in this budget request show those costs?

Admiral Caldwell. The total cost to develop the OHIO-Class Replacement reactor plant has been stable at \$1711M (FY 2010-FY 2027) since 2012 following the Navy's decision to slip the construction start by two years. The costs identified in the PB17 FYNSP are accurate and are consistent with the PB16 FYNSP.

Subcommittee. Do you anticipate there will be further cost increases associated with this program that you will have to accommodate in your budget plans? Or is the five-year plan presented in this budget request an accurate depiction of the program needs?

Admiral Caldwell. No cost increases are expected for the development of the OHIO-Class Replacement reactor plant. The costs identified in the PB17 FYNSP are accurate and are consistent with the PB16 FYNSP.

## MULTI-YEAR BUDGETARY NEEDS

Subcommittee. Admiral, previously the Subcommittee has noted affordability challenges in your plans for simultaneously conducting three major multi-year initiatives (Ohio-replacement, prototype refueling, and the spent fuel recapitalization project). In fiscal year 2015, Congress directed Naval Reactors to perform a comprehensive budget review.

What were the results of this review?

Admiral Caldwell. Naval Reactors will continue working to schedule a time to brief the House Appropriations Subcommittee on Energy and Water Development staff on the results of this review.

This report provided an analysis of alternative approaches to funding Naval Reactors' (NR) requirements. This analysis focuses on two "bounding" budget excursions, the first maintained top-line funding levels consistent with NR's FY

2015 President's Budget submission. The second excursion is consistent with the FY 2016 President's Budget request, except that the Spent Fuel Handling Recapitalization Project is frozen at its FY 2015 funding level, plus annual escalation.

Neither excursion meets NR's mission requirements and results in the following:

- Substantial increase to program costs for project re-planning, inefficiencies, and escalation as a result of work scope deferral beyond FY 2020 and for procurement of additional M-290 shipping containers;
- Increased operational risk from aging naval nuclear spent fuel processing infrastructure, which may result in facility failure and processing interruption, potentially reducing the operational availability of the nuclear- powered fleet; and,
- Delayed delivery of the OHIO-Class Replacement Ballistic Missile Submarine.

- The FY 2017 President's Budget continues the FY 2016 work efforts and is the most effective and efficient option to meet NR's mission and responsibilities to deliver on national priority projects.

Subcommittee. The GAO has warned that the President's nuclear modernization plan is not fully budgeted for, and that there will be major challenges with affording these programs starting in 2021. Are there any multi-year initiatives that NR is commencing or has already commenced that are not fully funded in the outyear budget targets submitted with your budget request?

Admiral Caldwell. No, there are no multi-year initiatives that are not fully funded in the FY 2017 outyear budget targets.

**DEFENSE NUCLEAR NONPROLIFERATION****OVERALL DECREASES FOR DEFENSE NUCLEAR  
NONPROLIFERATION**

Subcommittee. Ms. Harrington, the budget request for Defense Nuclear Nonproliferation is \$132 million, or 6%, below last year's level.

What is driving the decreases in the budget request for Defense Nuclear Nonproliferation?

Is this simply a result of the proposed cancellation of the MOX program?

Ms. Harrington. The decrease in the FY 2017 budget request for DNN programs, compared to the FY 2016 enacted budget, is due to the following reasons:

- The availability of prior year carryover balances to execute our nonproliferation activities; and
- Termination of the Mixed-Oxide (MOX) Fuel Fabrication project and the Department's identification of a dilute and dispose approach as a faster, less expensive path to meeting U.S. commitment to dispose of excess weapons grade plutonium.
- The successful conclusion of several initiatives related to Nuclear Material Removal activities supporting the 2016 Nuclear Security Summit.



## AMERICAN MEDICAL ISOTOPES PRODUCTION ACT (AMIPA)

Subcommittee. Ms. Harrington, NNSA has struggled to meet deadlines in AMIPA for the establishment of a domestic production capability for the medical isotope Moly-99 without the use of highly-enriched uranium. In addition, two of the four projects selected by DOE require the use of a U.S. research reactor that is fueled by highly-enriched uranium and rely on purification services to be performed by a Canadian partner.

What more could NNSA be doing to establish a secure domestic industry?

Ms. Harrington. NNSA is working with domestic commercial entities to accelerate the production of molybdenum-99 (Mo-99) in the United States without the use of highly enriched uranium (HEU), in accordance with the American Medical Isotopes Production Act (AMIPA). Through this technology-neutral program, NNSA has awarded cooperative agreements to accelerate the development of four independent technical pathways to produce Mo-99 in the United States. Since the beginning of this effort, NNSA's role has been to support commercial entities in accelerating their Mo-99 projects to production. Our current program policy of providing up to \$25 million based on a 50/50 cost share between the government and commercial partner for each project provides a robust government investment while ensuring that the government maintains a level playing field for each commercial partner and does not perpetuate the longstanding government subsidies of the Mo-99 industry that were a major factor in creating previous Mo-99 shortages.

Subcommittee. Will you be reviewing the management of this program?

Ms. Harrington. Each project is working to develop the technology to produce Mo-99 in the United States, and each of the projects is reviewed regularly by a team of Independent Technical Review experts. Additionally, AMIPA requires an annual review of the NNSA Mo-99 Program by the Nuclear Science Advisory Committee, and a review by the National Academies of Science, which is ongoing.

Subcommittee. Considering the limited success so far, is DOE considering issuing a new solicitation to seek out more partners? Could there be more potential partners out there?

Ms. Harrington. NNSA selected its commercial partners through the issuance of a Funding Opportunity Announcement in 2010, and does not plan to re-issue a new solicitation to select additional cooperative agreement partners, as we believe it is unnecessary to meet our program objectives. NNSA is aware of several other U.S. companies that are not NNSA cooperative agreement partners that are pursuing non-HEU Mo-99 technologies. The NNSA Mo-99 Program considered changing the 50%/50% cost share and increase of the \$25 million cap, but after careful evaluation considered a change is unnecessary to meet program objectives.

Subcommittee. Do you believe there will be any shortages in the availability of Mo-99 like there were a few years ago?

Ms. Harrington. According to the Organization for Economic Cooperation and Development's Nuclear Energy Agency, current Mo-99 production capacity is expected to meet global Mo-99 demand in the next five years, however these projections highlight the need for new commercial producers to enter the Mo-99 supply chain in order to mitigate possible Mo-99 shortages in the long term.

## MOLY-99 COOPERATIVE AGREEMENTS

Subcommittee. Ms. Harrington, each of the current cooperative agreement awards are capped at \$25 million, but the cap is set by NNSA policy rather than Congressional requirements.

How did NNSA arrive at the \$25 million funding cap?

Ms. Harrington. The 2010 Funding Opportunity Announcement (FOA) (DE-FOA-0000323) set the \$25 million funding limit, and clearly indicated that any additional project cost must be borne by the commercial partner. The FOA was designed to be consistent with early drafts of the American Medical Isotopes Production Act (AMIPA) that signaled a program lifecycle budget that led to a \$25 million limit for each the cooperative agreement projects.

Subcommittee. Going forward, how do you evaluate how much funding should be allocated to individual projects – particularly when some are greenfield vs. those that use existing reactors? Is it appropriate to have a one-size fits all approach?

Ms. Harrington. The AMIPA directs the Department to establish a technology-neutral program to accelerate domestic Mo-99 production. AMIPA does not direct the Department to provide different levels of funding based on the technical approach chosen by its commercial partners. NNSA's funding is awarded to cooperative agreements after a proposal is submitted by the commercial partner, and has been evaluated to meet all requirements, including the 50% cost share requirement. The NNSA Mo-99 Program considered changing the 50%/50% cost share and increase of the \$25 million cap, but after careful evaluation considered it unnecessary to meet program objectives.

## HEAVY WATER AT ARAK

Subcommittee. Ms. Harrington, the text of the Iran agreement states that the parties have agreed “to support and facilitate the redesign and rebuilding of the IR-40 reactor at Arak into a modernized...heavy-water moderated and cooled research reactor.” Heavy water reactors have valid uses for civil nuclear energy production, such as the Canadian “CANDU” reactors. However, heavy water technology is also associated with military plutonium production, and therefore it is considered to be a “dual use” technology. The JCPOA allows Iran to retain its heavy-water reactor technology at Arak.

Has the conceptual design for the Arak reactor been agreed-to?

Ms. Harrington. The conceptual design of the Arak reactor was described in detail and agreed to in the Joint Comprehensive Plan of Action (JCPOA). The JCPOA sets up a working group to facilitate the Arak redesign and to ensure that it conforms to the guidelines in Annex I.

The Department of Energy will play a key role to validate that the design concepts are consistent with the principal nonproliferation objectives of the JCPOA to not produce any weapons useable plutonium and to minimize the production of any non-weapons useable plutonium.

Subcommittee. Are there any engineered safeguards currently being employed in other heavy-water reactors or production sites around the world that are generally considered to be effective at preventing the use of this technology for weapons purposes or will new engineered features need to be designed?

Ms. Harrington. Safeguards-by-design concepts and practices for reactors and other fuel cycle facilities are becoming more and more commonly employed in new construction efforts to facilitate the ease of application of safeguards during construction and minimize the potential for facility misuse. One example of such a design feature is to minimize the number of unnecessary penetrations into the reactor core, which decreases the number of locations from which the facility could be misused. In this instance, safeguards monitoring measures can be focused on areas where

illicit irradiations could take place which increases the probability of detection and deterrence of such efforts as a direct result.

Subcommittee. Is there a way to monitor Iran's production of heavy water and will the future existence of a heavy-water production facility and reactor in Iran continue to pose a risk?

Ms. Harrington. Iran agreed under the JCPOA not to accumulate heavy water above a mutually agreed limit and to allow its remaining inventory and production of heavy water to be monitored by the IAEA. The IAEA has installed monitoring and surveillance technologies at the heavy water production plant in Iran to verify Iranian compliance with JCPOA parameters of production and inventory. These monitoring approaches make use of commercially-available technologies used in industrial processes, and from which the IAEA can rapidly assess production and inventory levels.

Iran committed in the JCPOA not to produce any additional heavy water reactors for 15 years, and after that to rely only on light water for future nuclear power and research reactors.

Subcommittee. Does your budget request support or provide any funding for the modernization of the Arak reactor?

Ms. Harrington. \$10M is provided to support JCPOA material management activities including the U.S. role in the Arak Modernization Project that will facilitate the redesign and reconstruction of the reactor, assuring that it will not produce weapon-grade plutonium. The Office of Material Management and Minimization funding will provide support to technical experts from the DOE national laboratories for the Arak Modernization Project to assure that the reconstructed reactor will not produce weapons grade plutonium. The Reactor Conversion program will verify that the Arak design continues to meet all JCPOA non-proliferation goals as the design matures.

## VERIFICATION OF IRAN'S PAST NUCLEAR ACTIVITIES

Subcommittee. Ms. Harrington, in their report on verifying the Iran agreement, the GAO also described concerns that, absent a complete accounting of Iran's past nuclear program being provided to the IAEA, the agency would be limited in its ability to detect undeclared activity going forward.

What information regarding the nature or composition of Iran's past nuclear activities does the agreement require Iran to disclose?

Ms. Harrington. The IAEA concluded its investigation into Iran's past military activities and has issued its final report (GOV/2015/68). Going forward, the JCPOA requires that "Iran will provisionally apply the Additional Protocol to its Comprehensive Safeguards Agreement in accordance with Article 17(b) of the Additional Protocol, proceed with its ratification within the timeframe as detailed in Annex V." The Additional Protocol both expands the declaration of activities Iran must make to the IAEA and the IAEA's ability to access undeclared sites to verify Iran's declaration. If the IAEA develops new information regarding undeclared Iranian activities, the Comprehensive Safeguards Agreement and Additional Protocol, along with the transparency requirements and access procedure negotiated in the JCPOA give the IAEA new tools to investigate those leads.

Subcommittee. How would the agreement identify covert or undeclared activities that Iran might have or might develop over the next 15 years?

Ms. Harrington. The JCPOA puts into place very robust transparency measures. There will be surveillance of the entire nuclear supply chain, including increased IAEA access to uranium mines, and continuous monitoring of uranium mills and centrifuge production, assembly, and storage facilities. This kind of monitoring ensures that it would be exceedingly difficult for Iran to divert materials or components from its nuclear infrastructure to establish new clandestine sites without the IAEA's knowledge.

In the JCPOA, Iran committed to provisionally apply the Additional Protocol (a set of transparency measures that allows the IAEA to request

access to undeclared facilities they have questions about), eventually to ratify the Additional Protocol, and also to fully implement Modified Code 3.1. Iran's provisional application of the Additional Protocol, which is already in place, means the IAEA can access any requested location in the country within a predetermined, limited time period.

## CERTIFICATION OF PROJECTS IN RUSSIA

Subcommittee. Ms. Harrington, the last two years, Congress has included a prohibition in the NNSA's budget that prohibits new work in Russia unless the Secretary provides Congress with a certification that such work is in the national security interest of the U.S.

Is there any prior year funding that you are unable to use because of the prohibition on new contracts for work in Russia?

Ms. Harrington. Most funding from FY 2014 and earlier has been moved for use in other program areas.

Subcommittee. Is there any funding in this budget request for work in Russia?

Ms. Harrington. No. Since the Congressional prohibition in December 2014 we have not made any budget requests for work in Russia.

Subcommittee. Is there any ongoing work at all and any chance for new areas of cooperation in the near future?

Ms. Harrington. Work under ongoing contracts with Russian organizations is continuing until all deliverables are received and previously agreed upon work is complete.



## MOX DEACTIVATION COSTS

Subcommittee. Mr. Administrator, the future years nuclear security plan show \$221 million to be spent over the next five years deactivating the MOX project. Initial estimates provides by NNSA describe that deactivating the MOX project could cost over \$1 billion, and that's if funding is readily available in a short period of time and doesn't have to be spread out over many years.

What is the cost of deactivating the MOX facility?

Administrator Klotz. The Department has estimated that it will cost \$500 to \$750 million to terminate the MOX project.

Subcommittee. Does the \$221 million per year estimated include demolition or disposition of the facility or is there another cost assumption that Congress should be using to consider the near term costs of terminating the project?

Administrator Klotz. The costs to terminate the project do not include the demolition or disposition of the MOX Facility. As long as the facility is not used to process plutonium or MOX fuel it does not have environmental contamination. Also, once MOX is terminated, the building will be available for other potential uses.

**THE HONORABLE CHUCK FLEISCHMANN****SUPPLY CHAIN MANAGEMENT CENTER**

Mr. Fleischmann. Members of the small business community have raised issues with the NNSA Supply Chain Management Center (SCMC) and more specifically the Enterprise-Wide procurement agreements. What specific changes will be made to address these issues to give small businesses a more level playing field to compete on procurements?

Administrator Klotz. In an effort to address concerns regarding a level playing field for small business to compete on procurements, the NNSA's SCMC has recently implemented new opportunities for small businesses. First, the SCMC has created regional agreements, in addition to the already established national agreements, that present small businesses with an opportunity to expand their local base to a regional or national one. As new opportunities are identified for creation of strategic sourcing agreements, the SCMC works with representatives from each of the sites to identify local site specific requirements and high performing vendors to participate in the procurement. Site specific requirements are incorporated into SCMC agreements that level the playing field for competition and performance. For example, in 2014, a national level agreement for Dell computers was awarded to Wildflower International, a small business, from Santa Fe, New Mexico with an estimated value of \$200 million. In August 2015, a regional agreement for industrial supplies was awarded to Frank's Supply Company, a woman- owned small business from New Mexico, worth an estimated \$35 million over seven years.

Second, the SCMC held a small business information meeting in Albuquerque, New Mexico on February 18, 2016, with the New Mexico congressional delegation present, for current and potential small business partners in New Mexico to generate dialogue about the tools used by SCMC and how local small businesses can engage with NNSA and broader DOE opportunities. Approximately 350 people attended with 15 persons watching online. As a result, SCMC has seen a rise in supplier online applications. The SCMC will be holding similar open information meetings/open forums to engage with the small business community.

In conclusion, NNSA supports small businesses and encourages SCMC to incorporate practices to help local small businesses. As the Department and SCMC continue to grow and mature in their supply chain initiatives, we commit to ensure that the needs and impacts of local business inform the decision making processes.

